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ABSTRACT

Designed to provide practical, up-to-date, basic information on home gardening for vocational agriculture students with only a limited knowledge of vegetable gardening, this reference unit includes step-by-step procedures for planning, planting, cultivating, harvesting, and processing vegetables in a small plot. Topics covered include plot selection, soil preparation, tools, selection of vegetable varieties, selection and ordering of seed, transplanting vegetables, planting the garden, care of the garden, and harvesting and processing. Appended material provides information about chemical weed control, insect identification and control, disease control, popular vegetable varieties, a list of seed companies, and notes on growing specific vegetables. The information is provided in question and answer format with numerous illustrations interspersed. (NJ)

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A REFERENCE UNIT ON HOME VEGETABLE GARDENING

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Preface

Until the late 1940's the home vegetable garden was considered one of the necessities of life. After World War II, however, the supply of vegetables in the markets became more abundant and the quality was better. Low prices and rising wages caused the average person to buy more and more produce in the stores and grow less and less at home. By the late 1960's, only a few people were growing vegetables for the masses and a year-round home vegetable garden was almost a thing of the past.

Then came the 1970's with inflation and other factors pushing the price of food to record heights. It seemed that everything the consumer needed was in short supply—meat, bread and vegetables. There was a shortage of so many items that people began to realize that a new life style was evolving with which they might not be able to cope. These shortages were due in part to a rise in minimum wages for agricultural labor, the high cost of land and equipment, and a dramatic price increase in the input materials such as fertilizer and fuel needed to produce crops.

As a result of this inflationary economy, the price of vegetables also soared to new heights in the markets and often the quality declined. Under these circumstances, more and more individuals and families began to reassess their situation.

The years of plenty from the 1940's to the 1970's produced a generation of people who lacked the know-how to produce vegetables on their own. The continuing rise in prices, however, forced many to attempt vegetable gardening. As a result, an old way of life was rediscovered by many—a way of life which increased the sales of garden seed, Mason jars, steam pressure canners, and home freezers.

This publication is dedicated to and designed for the new generation of vegetable gardeners. More specifically it is designed for use in vocational agriculture programs in teaching vegetable gardening. During the summer of 1975, some eighty vocational agriculture teachers met at Mississippi State University. At this meeting, the teachers assisted by State Department of Education personnel and MSU horticulturists, compiled an outline which included all areas related to home gardening. From this outline, this reference unit was developed in answer to the teachers' request. An effort was made to compile a complete reference for use by both the novice and veteran gardener to help them meet their future food needs.

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The authors wish to express their appreciation and thanks to Dr. Milo Burnham and Dr. Jesse Harness, Extension Horticulturists, Mississippi Cooperative Extension Service for the use of tables and information from the **WIN Garden Guide.** Appreciation is also due to Dr. David F. Young and Mr. James H. Cochran, Extension Entomologists, for providing the information found in the appendix on garden insects and their control.

INTRODUCTION

For the past century, the practice of raising vegetables in the home garden was a normal part of life for both urban and rural residents of Mississippi. The garden was as much a part of everyday life as the smokehouse, the butter churn, and the kerosene lamp. Both storekeeper and farmer depended upon the garden for the needed foodstuffs to support their families throughout the year. In addition to supplying the vegetables which are normally grown by most gardeners today, the garden also supplied peanuts for making peanut butter, sugar cane and sorghum for making syrup, and sage and pepper for seasoning homemade pork sausage.

Naturally, such gardens were not fifteen- by twenty-foot plots. In fact, most families had two gardens—a kitchen garden located near the house and devoted to plants needing daily care and the field garden located in a nearby field and devoted to larger plants such as corn, watermelons, sugar cane, and "canning" tomatoes.

As the population of the United States began to shift from the rural and small-town locations to the urban and suburban settings, the interest in home vegetable gardens declined.

As incomes began to rise and food prices remained stable, even people in the rural areas found that it was easier to buy food in the store than to raise vegetables at home. Others found an increase in leisure-time activities to be more profitable, in their opinion, than spending time tending the garden. During the 1960's the number of home vegetable gardens declined to an all-time low.

Events in the 1970's rapidly reversed these trends. First meat prices sky-rocketed and housewives began to rebel against the high cost of grain-fed meat by turning to more and more vegetables. This rebellion in turn led to a shortage of vegetables, either fresh or processed, and an increase in the price of available vegetables. As food prices continued to increase, more and more adults remembered the rural gardens of their childhood. Across the United States rural, suburban, and even urban dwellers began turning-under backyards, clearing vacant lots, and replacing flowers with tomatoes, radishes, and beans. Garden equipment manufacturers found that their supplies could not meet the public's demand. Seed companies reported that seed supplies were depleted and it was almost impossible to buy a home freezer. The shortage of canning lids was worthy of nation-wide news coverage in the summer of 1975.

As more and more people began to garden, however, they found that vegetable gardening was not as easy as it looked. Many were plagued with surplus vegetables they had overplanted. Others found that insects were devouring their crops or that weeds grew up almost overnight to choke young plants. Many novice gardeners were disappointed by low yields, poor stands, and diseased plants.

This publication was written to provide practical up-to-date basic information on home gardening. It was designed for use by vocational agriculture students with only a limited knowledge of vegetable gardening. Its basic objective is to provide a step-by-step procedure for planning, planting, cultivating, harvesting, and processing vegetables in a small plot.

Gardening can be an economical means of supplying food for the family. The National Garden Bureau estimates that intensive use of a 25-by-15 foot plot can save $240 to $270 in food costs annually. Production inputs for the garden included fertilizer and insecticides, $15; tiller rental, $5; transplants, $10; and seed, $9. Total input costs were $49. The Bureau estimated that the garden would yield crops having a value of $285. This represents a savings of $.65 per square foot.

Based upon these figures a year-round home garden containing 1000 square feet could save over $650 in food costs to the family.

In addition to the economic benefits of home vegetable gardening, Dr. Milo Burnham, Extension Horticulturist, Mississippi Cooperative Extension Service, cites the following benefits of home gardening:

(1) people respond to the human need to handle the soil—the so-called "return to nature" movement so popular among young people.

(2) more leisure time allows people to do as they please, and gardening gives a feeling of productive leisure time.

(3) home grown vegetables, when properly grown and harvested, are of superior quality.

(4) gardening provides outdoor exercise and recreation and also provides a therapeutic effect after a hard day at the office.

(5) there is quite a thrill to producing your own food.

Chapter 1

FACTORS IN SELECTING THE GARDEN SITE

Many factors influence the productivity of a home garden including time spent in cultivation, weather, fertilization, and variety selection; but perhaps the one factor that is most influential on all of the other factors is the selection of the garden site. When properly selected, the site of the garden can influence not only the production of the garden but also the weed-control methods used, the effect of a cold snap,the amount of irrigation needed, and the amount of fertilizer needed. For urban home owners on small lots or for persons having access to a limited amount of land, site selection may be very limited. Most rural families, however, may have several available locations to use for the home garden. Before selecting a site, however, the gardener should be able to answer the following questions:

1. Is the site convenient to the home and to a water supply?
2. Does the space available meet the needs of the family?
3. Does the site receive sufficient sunlight?
4. Can the site be protected from animals?
5. Is the quality of soil suitable for a garden?
6. Does the site have suitable drainage?
7. Is there danger of competition from the root systems of trees and/or large shrubs?

1. Is the site convenient to the home and to a water supply?

Convenience of the site is very important in planning for the home garden. Vegetables are like all other agricultural products; they do not grow by themselves. Most successful gardeners spend at least a small amount of time each day in their gardens. In only a few hours, insects such as the army worm or blister beetle can cause serious damage to plants. Grass and weeds can grow up almost overnight, robbing the garden plants of valuable nutrients and water. As the garden begins to produce vegetables, the gardener will need to keep a close watch on the ripening fruits. With many garden plants, it is important that ripened vegetables be picked or the plants will cease producing. Other plants, such as corn, are ready to be harvested during a very short time period. All of these factors demand that the home garden be placed in a close and convenient place so that the gardener can have access to his garden at a moments notice.

The garden should also be located near a convenient water supply. It is often necessary to provide supplemental irrigation to the plants during the late summer and early fall to maintain growth and production. Even if supplemental irrigation is not needed, a source of water is required when transplanting young plants, mixing sprays for insect, weed, and disease control, and washing vegetables after they have been harvested. Also a supply of water is often needed to refresh the gardener during the hot summer months.

2. Does the space available meet the needs of the family?

Selection of a garden site is dependent upon the size of garden desired and the needs and desires of the family. Even if the garden site is located conveniently to the house and water supply, it may not be large enough to supply the needs of the family. In cases such as this, several alternatives can be considered. The first alternative is to choose another site. This may not be desirable if the new site is some distance from the home. A second alternative is to have two garden sites. The first site located near the house and devoted to plants such as beans, tomatoes, okra and other vegetables which require frequent harvesting and the second garden site located farther away to be used for crops such as corn, peas, and other crops which do not require daily harvesting or require wider rows and more space. In this manner, the convenient site can be used and the needs of the family met.

3. Does the site receive sufficient sunlight?

A good garden site provides the plants with the maximum amount of sunlight. No large trees or shrubs should shade the garden. If one end of the garden has more shade than the other, leaf and root crops such as lettuce or cabbage should be planted there and fruit crops such as tomatoes, beans, or peas should be planted in the sunlit area.

4. Can the site be protected from animals?

A great deal of damage can be done in a short period of time by animals such as cows, deer, rabbits or racoons. Other animals such as dogs and cats can cause damage by digging and running in the garden. Placing the garden close to the house not only discourages wild animals but also allows for close observation of domestic animal activities near the garden. Any garden located in a rural area should be protected by a strong fence.

5. Is the quality of the soil suitable for a garden?

The quality of the soil plays an important part in site selection. A good garden soil is deep, moderately well drained and friable. The friability of a soil refers to the way the soil crumbles when tilled. A good garden soil will literally "fall to pieces" when plowed or disked, that is, a small amount of plowing is required to produce a very loose seedbed. Depth of the soil is defined as the distance from the soil surface to the parent material from which the soil developed. Fertility of the soil is determined by the amount of nutrients present in the soil. Natural fertility is not as important today as in the past due to the availablity of commercial fertilizers. A well-drained soil is one which has not only good surface drainage, but also allows for internal drainage of excess water from the soil itself. In addition to these factors, the garden soil should be well supplied with organic matter, be reasonably free from rocks and stones, and should not have a hard-pan which interferes with downward growth of plant roots.

6. Does the site have suitable drainage?

As previously mentioned, soil drainage involves movement of water in two directions. Surface drainage refers to the movement of excess water in a horizonal direction across the soil surface. Interior drainage refers to movement of water in a vertical direction through the soil itself. Suitable drainage is the ability of the soil to lose excess water while retaining a sufficient amount for future use by the plants. (See Figure 1-1)

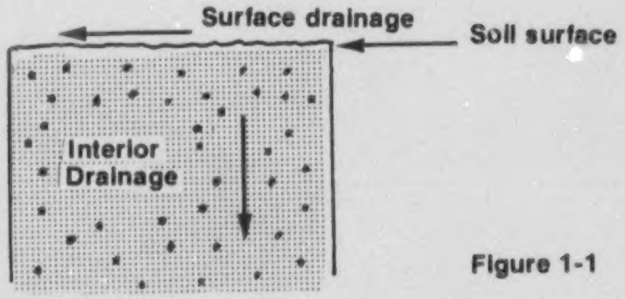

Figure 1-1

Surface drainage is dependent upon the slope of the soil surface. Slope is defined as the number of feet of drop or rise per 100 feet of surface length. A 3% slope would drop three feet for every 100 feet of length. Surface drainage increases as the slope increases, but erosion also increases. Usually a garden should be placed on fairly level ground having a slope of 0-8%. Low spots or depressions can be drained by the use of ditches. Other ditches and terraces can be used to keep run-off water from surrounding land out of the garden.

Internal drainage is dependent upon the texture of the soil. Texture refers to the percentage of sand, silt, and clay present in the soil. Usually the more sand present the better the internal drainage. As clay content increases, the internal drainage ability of the soil decreases. Extremely sandy soils, however, tend to allow too much water to move through the soil and out of reach of the plant roots. Such soils are said to be droughty. A sandy-loam soil composed of a mixture of sand, silt, and clay is usually best for most garden crops.

7. Is there danger of competition from the root systems of trees and/or larger shrubs?

In addition to the danger of shading the garden plants, trees and shrubs can also rob the garden soil of needed nutrients and water. Certain trees can develop root systems capable of stretching fifty feet or further into the garden. Competition from these roots can be partially eliminated by digging a ditch 1 1/2 to 2 feet deep between the tree and the garden. The trench should be lined with heavy tar paper and then filled in. This procedure usually prevents damage to the garden plants for several years.

Chapter 2

PRE-PLANT SOIL PREPARATIONS

Prior to the actual planting of a garden, the successful gardner usually spends several hours in preparing the soil for planting. Soil preparation should actually begin in the fall and winter when lime, phosphates, potash, and compost are mixed into the seedbed. Other pre-plant operations include soil sterilization and removal of plant residues from the previous year. Before planting, the home gardener should know the answer to the following questions:

1. What steps are involved in taking a soil sample?
2. Why should liming materials be applied to the soil?
3. When and how should fertilizer be applied to the garden?
4. What are the advantages of adding organic matter and compost to the soil?
5. How should the soil be prepared for planting?
6. Why should soil be sterilized? How?

1. What steps are involved in taking a soil sample?

The most accurate means for determining the fertilizer and lime needs of the garden is to take a soil sample and have it tested. The Mississippi Cooperative Extension Service Soil Testing Department performs this service at no cost to Mississippians. The Soil Testing Service makes recommendations on the amount of lime, nitrogen, phosphate, and potash presently available in the soil and on the amount of these materials needed for vegetables. Instructions on making the test, sample boxes, and sample identification forms are available from the local county agent or vocational agriculture teacher.

The procedure for taking a soil sample is very simple and in the home garden requires only a few minutes. The only tools required are a shovel, a bucket, and a spatula. The gardener should travel in a zig-zag motion around the garden. (See Fig.2-1) At each of the twenty spots shown on the diagram, a sample of soil should be taken from the top 6 inches of the soil. To take the sample, simply remove a slice from the topsoil and place about a tablespoon full of the slice in the bucket. A sample of subsoil should be taken from 6 to 12 inches in depth at three or four locations (spots 4, 8, 12, 19 on diagram). This sample should be kept separate from the topsoil and marked "subsoil" on the sample box.

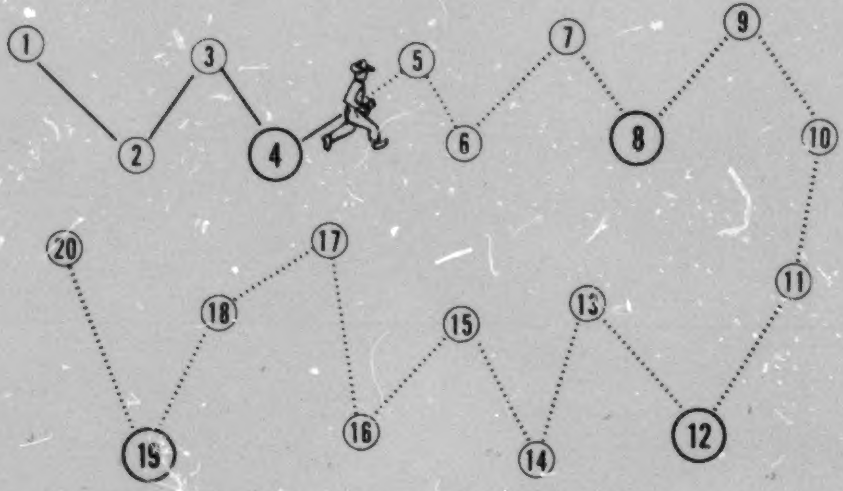

Figure 2-1
(courtesy Soil Testing Service, Miss. State Univ.)

After taking all samples, the topsoil collected should be thoroughly mixed and the sample box marked "topsoil." The sample identification form or field sheet should be filled out in detail. (See sample form.) The sample boxes and field sheet should then be mailed to the Soil Testing Service, Mississippi State, MS 39762 or taken to the local county agent's office.

The Soil Testing Service tests over 48,000 different samples each year from fields, pastures, gardens and orchards. These samples are processed and the reports are mailed to the county agent who in turn contacts the gardener. For most gardens, recommendations will be made on the basis of pounds of fertilizer per 1000 square feet. The recommendations will be made in pounds of nitrogen, phosphate, potash and lime needed and in terms of complete fertilizer needed. A complete fertilizer contains nitrogen, phosphate, and potash.

In taking a soil sample, it is vitally important that all areas of the garden be sampled. For an accurate recommendation, the sample must be representative of the entire garden. A sample taken from only three or four points will not produce as accurate a report as one taken from the twenty recommended spots.

Another important factor to remember in taking a soil sample is time. For spring planting, the sample should be taken in December or January to insure that the report will be back by planting time. Actually, the sample should be taken earlier to allow time for needed lime to react with the soil.

2. Why should liming materials be applied to the garden?

Liming materials are applied to "sweeten" the soil. Most soils in Misissippi are "sour," that is they contain acids. The acidity of a soil is measured by use of pH. A soil

SOIL TESTING DEPARTMENT, MISSISSIPPI COOPERATIVE EXTENSION SERVICE
AND
MISSISSIPPI EXPERIMENT STATION COOPERATING, MISSISSIPPI STATE, MISSISSIPPI

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Name Hap E. Gardner Mailing Address Rt 2 Box 440 Town Anyplace, Ms

County Somewhere Nearest Town Anyplace Distance & Direction of Nearest Town 12 miles NE Date 11-9-74

Field Number or Name	Size of Field	Depth Top Soil (Inches)	Number Places Soil Taken for Sample	Crop to Be Grown Next	CROPPING HISTORY			FERTILIZER HISTORY		LIMING HISTORY		TOPOGRAPHY			COVER CROP	
					Year	Crop	Yield Good, Average, Poor	Analysis	Rate Per ~~Acre~~ 1000 sq ft	When Applied Month & Year	Amount Per Acre	Level	Hilly	Bottom	Kind of Cover Crop	Turned Under
Veg. Garden	20 ft x 50 ft	5	20	Vegetables Beans Peas Tomatoes Corn Onions melons (wild)	1974	Veg.	Average	6-8-8	200 lbs	None	—	✓			Volunteer winter weeds	Yes
					1973	Veg.	"	6-8-8	200 lbs							
					1972	Fallow	-									

8

Is there any specific problem with any one of these soils?

Those, other than the farmer, desiring a copy, give name and address:

having a pH of 7.0 is considered neutral. A pH below 7.0 is acid and above 7.0 is alkaline. Most vegetables grow best at a pH of 6.0 to 6.5 or in a slightly acid soil. At this range most nutrients in the soil are more readily available to the plants than at higher or lower values. Lime should only be applied when soil tests indicate the need for it.

Lime should be applied by broadcasting it over the entire surface and then plowing, disking, or tilling it into the soil. Unlike most fertilizers, lime does not dissolve easily in water and must be thoroughly mixed into the soil by plowing. It is important that lime be applied at least 2 to 3 months before planting so that it will have time to neutralize and sweeten the soil.

There are several liming materials. Most farmers use ground limestone on their fields because it is more economical. In the garden, however, hydrated lime, burned lime, or basic slag can be used and will give quicker results. All liming materials should be ground to fine particles. This grinding places more surface area of lime in contact with soil acid and thereby hastens neutralizing. (See Table 2-1.).

Table 2-1

COMMON LIMING MATERIALS

Material	**Calcium Carbonate Equivalent**
1. Pure calcium carbonate	100%
2. Ground limestone	80-90%
3. Dolomitic lime *	105-110%
4. Basic slag	70%

*Also supplies magnesium

3. When and how should fertilizer be applied to the garden?

Most garden soils contain sufficient nutrients for plant growth with the exception of nitrogen, phosphate, and potassium or potash. The soil-test report will indicate the amount of these materials to be applied. These nutrients can be purchased separately or in a combined form as commercial fertilizer. The nutrient content of commercial fertilizer is printed on the sack. A fertilizer rated 9-12-12 would contain 9 percent nitrogen, 12 percent phosphate, and 12 percent potash.

Time of fertilization is dependent upon the type of fertilizer used. Nitrogen is easily washed from the soil and should be applied at the time of planting or shortly thereafter. Phosphate and potash, on the other hand, can remain in the soil longer without being lost. If the individual fertilizer nutrients are to be applied, the phosphate and potash can be spread prior to planting and incorporated into the soil. Nitrogen can then be applied in a band at planting time. Some gardeners prefer to apply a portion of the nitrogen at planting time to start the plants growing and then "sidedress" the plants a few weeks later. Sidedressing involves placing nitrogen fertilizer down the sides of the plant rows. If a complete fertilizer such as 13-13-13 is to be used to supply all nutrients in one application, it should be applied just prior to planting to prevent loss of nitrogen.

There are two main methods for applying fertilizer in the soil-broadcasting and banding. Broadcasting involves spreading the fertilizer over the entire garden area. Spreading can be done by the use of fertilizer distributors or by using a bucket and a sweeping motion of the hand. Banding involves placing the fertilizer in a band in the row. The fertilizer should be placed three to four inches to the side of the seed and slightly below the seed. (See fig. 2-2). If the fertilizer is placed directly below the seed, it may damage the roots of the young plant.

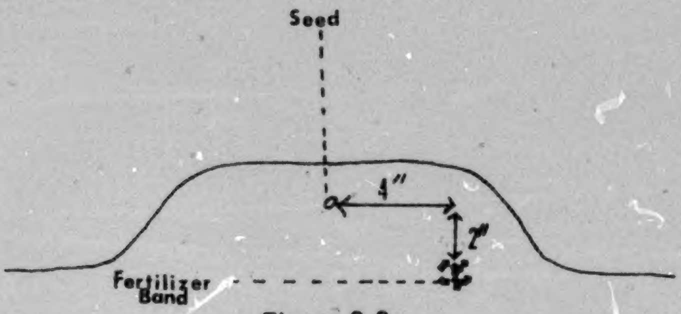


Figure 2-2
Courtesy Dr. Milo Burnam, Extension Horticulturist

Some gardeners prefer to use a combination of the two methods. They broadcast about half the fertilizer and till it into the soil. The remainder of the fertilizer is placed in band. This method reduces the danger of damaging the plants and also provides some of the benefits of banding.

Table 2-2 shows rates of application of fertilizer for broadcasting and banding in gardens. For practical application, 1 pint of fertilizer equals 1 pound. Table 2-3 shows some common fertilizer materials and their nutritimal content.

4. What are the advantages of adding organic matter and compost to the soil?

Organic matter is any dead plant or animal material found in the soil, including manure, peat moss, straw, sawdust, leaves and any other plant and animal materials. Well-decomposed organic matter is called humus. Compost is humus which has been produced with the aid of man. Humus is very beneficial to the soil, serving the following purposes:

a. It increases the water-holding capacity of the soil.
b. It increases the nutrient-holding capacity of the soil.
c. It supplies natural nitrogen.
d. It aids in the prevention of erosion.

Table 2-2. Approximate rates of fertilizer application per 50 or 100 feet of garden row, and per 100 to 2,000 square feet of garden area, corresponding to given rates per acre.

Measurement	Weight of fertilizer to apply when the weight to be applied per acre is—			
	100 pounds	400 pounds	800 pounds	1,200 pounds
Space between rows, and row length (feet):	Pounds	Pounds	Pounds	Pounds
2 wide, 50 long	0.25	1.0	2.0	3.0
2 wide, 100 long	.50	2.0	4.0	6.0
2 1/2 wide, 50 long	.30	1.2	2.4	3.6
2 1/2 wide, 100 long	.60	2.4	4.8	7.2
3 wide, 50 long	.35	1.4	2.8	4.2
3 wide, 100 long	.70	2.8	5.6	8.4
Area (square feet):				
100	.25	1.0	2.0	3.0
500	1.25	5.0	10.0	15.0
1,000	2.50	10.0	20.0	30.0
1,500	3.75	15.0	30.0	45.0
2,000	5.00	20.0	40.0	60.0

Table 2-3

Common Fertilizer Materials

Material	%N	%P	%K
Ammonium nitrate	33.5	0	0
Sodium nitrate	16	0	0
Urea	42-46	0	0
Super phosphate	0	18-20	0
Ammonium phosphate-sulfate	16	8.8	0
Muriate of potash	0	0	60
Sulphate of potash-magnesia	0	0	18
Basic slag *	0	4.4	0

*Also serves as a liming material—Liming value 70% calcium carbonate equivalent.

Even a small increase in the organic matter content of some soils can significantly increase productivity.

There are several means for increasing the organic-matter level of the soil. Once vegetable crops have stopped producing they should be cut up using a lawnmower or rotary clipper. The cuttings should then be cut into the soil, using a rotary tiller, moldboard plow or disk. Manure is also an excellent source of organic material and also contains appreciable amounts of nitrogen and smaller quanities of phosphate and potash.

Compost, as already stated, is humus produced with assistance from man. The gardener should make his own compost by using a compost heap. Building a compost heap is a simple produdure. Leaves, sawdust, lawn clippings, garbage and any other organic materials can be used. The materials can be dumped on the ground or encased in a bin made of net wire or other materials. Place the organic material in a six-to eight-inch layer. Apply 5 to 7 lbs. of both commercial fertilizer and limestone over the layer. Use either a commercial composting material or manure to add bacteria which hasten decomposition. Moisten the layer but not to the point that water runs out of the material. Cover the first layer of fertilizer and organic matter with a second layer and a third layer and so on.The pile should be covered with a tarp to prevent rain water from washing nutrients out of the decomposing material. Keep the entire pile damp, however, by watering every other day for two weeks. In about six weeks the entire pile should be forked over into another pile, and allowed to remain there until thoroughly decomposed. The compost heap should be located away from the house as it can be unsightly and rather smelly.

Manure and compost should be applied prior to planting and tilled into the soil.

Another way to add organic material to the soil is to grow cover crops during periods when the garden is not in use. Cover crops include such grasses as ryegrass, wheat, and oats or legumes such as clover. The advantage to growing clover is that it is a legume which adds nitrogen to the soil. The cover crop should be plowed under while still green and actively growing since this will aid in rapid decomposition.

5. How should the soil be prepared for planting?

Steps to be taken in preparing the soil in a garden for planting will depend upon the type of soil found in the garden. In the heavy clay soils, fall breaking is profitable if the slope of the ground is level enough to prevent erosion. Usually the lighter, sandy soils should not be prepared until planting time, especially if there is danger of erosion.

The soil should never be plowed or worked when the moisture level is too high. To test soil moisture, mold a handful of soil into a ball. If the ball is not sticky and crumbles readily when mashed with the thumb, the soil is dry enough to work. Tilling a soil when it contains too much moisture can result in the formation of large clods when the soil dries.

In preparing soils which show evidence of having a hardpan, it is advisable for the gardener to subsoil or chiselplow before planting. There are two types of hardpans—a traffic pan caused by the use of power machinery and a genetic pan caused by natural soil formation. Hardpans prevent interior drainage in the spring and prevent downward root movement to obtain water during the summer. Usually the traffic pan is only a few inches in depth and can be easily broken up. Genetic pans, however, may be several feet in depth and usually cannot be broken.

Final preparations for planting should be aimed at pulverizing the soil to produce a seedbed that is free of clods and coarse trash. A shovel and hoe, rotary tiller, or disk can be used to accomplish this objective. The seedbed should be broken to a depth of 6 inches and then smoothed using a rake or harrow.

6. Why should soil be sterilized? How?

Sterilization of the soil involves killing all of the living material in the soil, including seeds, plants, bacteria, insects, etc. Usually, the soil is sterilized for the specific purpose or purposes of (1) killing nematodes, (2) killing weed seeds and plants, and (3) killing soil insects.

There are four methods that can be used to sterilize soil. They are:

a. Heat—by raising soil temperature to 180°F for a period of several hours, all weeds, seeds, insects, and bacteria will be killed. This method is practical for use in greenhouse or pot-plant cultures only.

b. Soil fumigants—These granular formulations are incorporated into the soil and release a gas which sterilizes the soil.

c. Liquid fumigants—These sterilants are applied in a liquid form by pouring them into a trench which is then closed.

d. Gas fumigants—Gas fumigants are applied under a gas-tight cover and gradually worked into the soil.

There are several fumigants sold on the market today. The most common of these is methyl bromide. When using any fumigant, the gardener should **carefully** read and understand all instructions and precautions. Usually there is a required waiting period before planting can take place.

Chapter 3

GARDENING TOOLS

The type of tools needed in the garden will naturally depend upon the size of the garden. In small gardens, the gardener may only need the basic hand tools such as shovels, rakes, and hoes. The medium size garden may require power tools such as a rotary tiller. In the larger gardens found on many farms, field equipment and tractors may be used for soil preparation and cultivation. As equipment rental facilities become more and more common, the small gardener is finding that he can rent tillers or cultivators for use in his garden also. In buying tools, the best practice is to start with the basic hand tools and add specialized hand tools and power tools as needed. Usually, the home gardener will find that buying a high-quality tool is more economical in the long run than buying a cheaper lower-quality tool. In buying and using tools, the gardener should consider the following statements:

1. What hand tools are needed for the home garden?

2. What power tools are needed?

3. What is required for maintenance and care of tools?

4. What factors should be considered in the safe use of tools?

1. What hand tools are needed for the home garden?

Regardless of the size of the garden, certain hand tools are essential. These tools include shovels, rakes, hoes, and forks for working the soil, sprayers and dusters for applying pesticides, and hoses for watering the garden and washing vegetables. Other hand tools that are sometimes used in home gardening include wheel hoes, hand-propelled fertilizer applicators and push planters. Some gardeners also use machetes, Warren hoes, pruning shears, and other tools for certain operations in the garden. (See Fig. 3-1.)

In the small gardens found in the backyards of many urban homes, a shovel, rake, and hoe are the only tools needed. Using the shovel, the gardener can break the soil. The hoe can be used to break the clods followed by the rake to level the seedbed. Furrows can be created with the hoe, the seed placed by hand and then covered with the hoe again.

It is still a proven fact that the hoe is one of the most effective weed-control measures known to man. Unfortunately, it is not the easiest method to use. Hoes can come in many different shapes and forms. Most common garden hoes have a 6- to 8-inch wide blade.

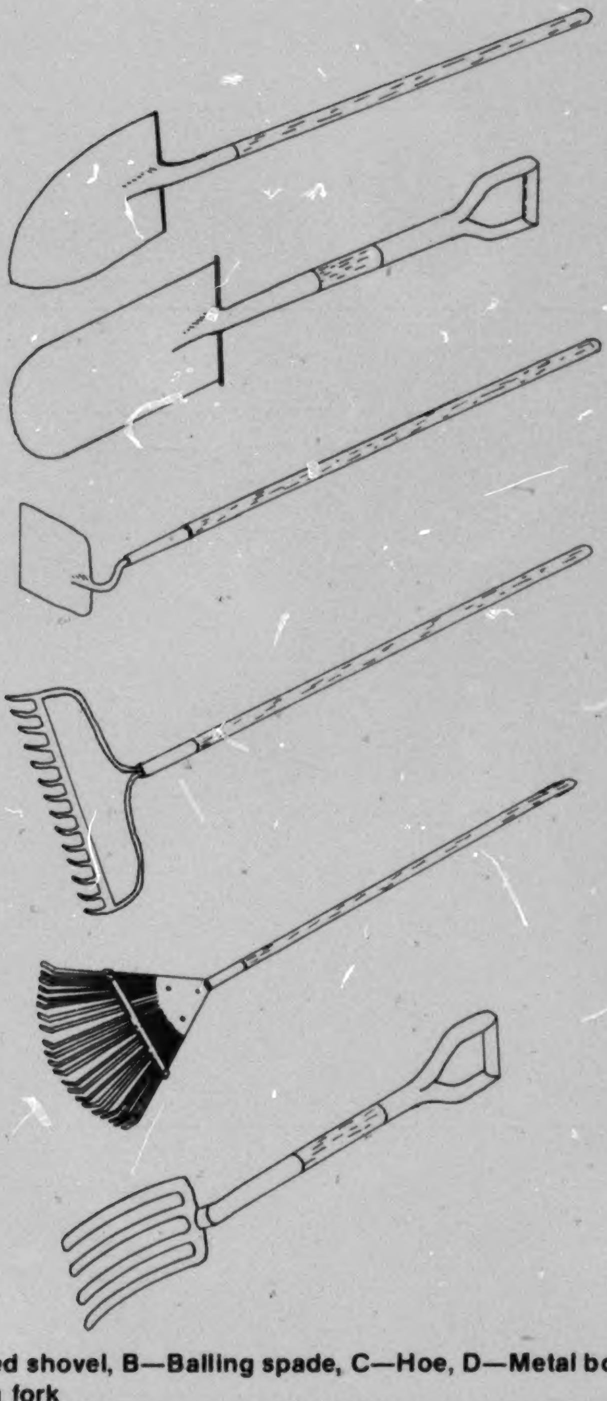
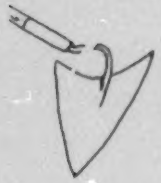


Fig. 3-1

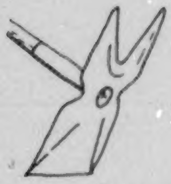
A—Round pointed shovel, B—Balling spade, C—Hoe, D—Metal bow rake, E—Lawn rake, F—Spading fork

Figure 3-2



The Warren hoe (Fig. 3-2) is a specialized hoe which is useful in opening furrows for seed planting. The furrow is made with the pointed end and once the seed is planted the "ears" can be used to cover the seed. This hoe can also be used to remove weeds between the plants and furrows.

Figure 3-3



The weeding hoe (Fig. 3-3) is a combination tool. One side is a hoe and the other side is a weed puller.

The more sophisticated small gardener may prefer to purchase a wheel hoe (Fig. 3-4) for use in his garden. This tool is actually a push plow which can be equipped with several types of plows for cultivation between the rows. The wheel hoe is usually most effective in the coarse-textured sandy soils.

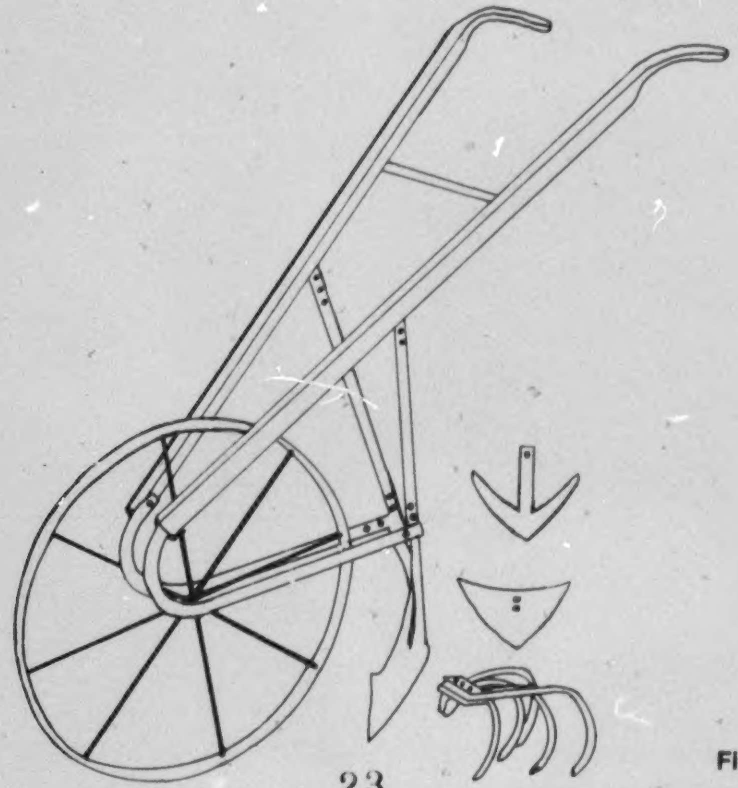
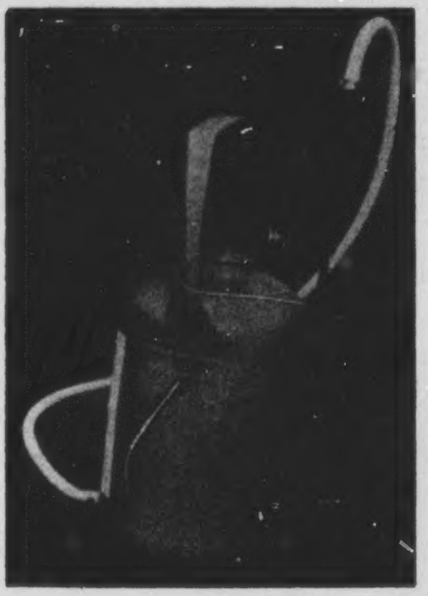


Figure 3-4

The compressed-air sprayer (Fig.3-5& 3-6) has several uses in the garden. It can be used to apply insecticides, herbicides, and fungicides. Caution should be used in using the same sprayer for several uses as some herbicides have residual properties which can affect plants even after the sprayer has been rinsed.



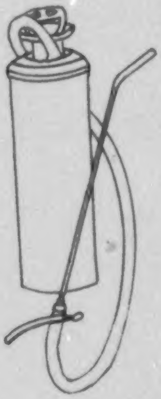


Figure 3-6

Figure 3-5. A Knapsack type sprayer suitable for use in home gardens for applying spray type pesticides.

A second type of sprayer used in some home gardens is a hose proportioner. This is the least expensive of the sprayers and consists of a glass jar and a metering device which attaches to an ordinary garden hose. As water from the hose passes through the metering device, concentrate in the jar is drawn into it, mixed with water and sprayed out. This sprayer is best used for spraying insecticides and fungicides. It is the least accurate method of applying spray materials and should not be used for the more precise applications such as applying herbicides.

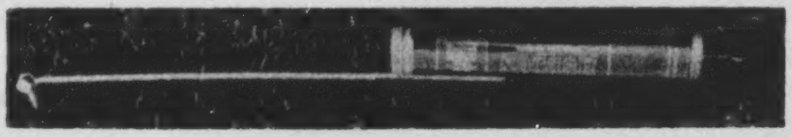


Figure 3-7. A small dust gun for applying pesticides as dust formulation to home gardens.

Some gardeners may prefer to use dusts for controlling insects. Dusters come in many different shapes and sizes (Fig. 3-7). For small jobs a home-made duster can be made using a fruit jar with holes punched in the top.

A water hose is another necessity for gardening. Hoses range in size from 7/16-inch diameter up to 3/4-inch diameter and in price from $3.00 to $30.00, depending upon diameter, length, and construction. The type of hose the gardener buys will depend upon the intended use of the hose. For occassional light duty, use the smaller, less expensive hose may be all that is needed. For more frequent use, the larger hose with more reinforcement is needed. Reinforcement refers to the materials inside the hose itself. The least expensive hoses usually consist of only plastic and easily rupture under pressure if used continuously. The more expensive hoses are made of rubber and reinforced with tire cord or other material. These hoses usually can handle normal water pressure for extended lengths of time.

For the really sophisticated hoe gardener, a push planter is available (Fig. 3-8, 3-9). Models range in price from $40 to $120, depending upon the features found on the planter. These planters operate on the same principles as the planters used in farming. They open the soil, plant the seed, cover it, and pack the seedbed. These planters may also be used to place fertilizer in a band in the seedbed but usually cannot perform both operations at the same time.

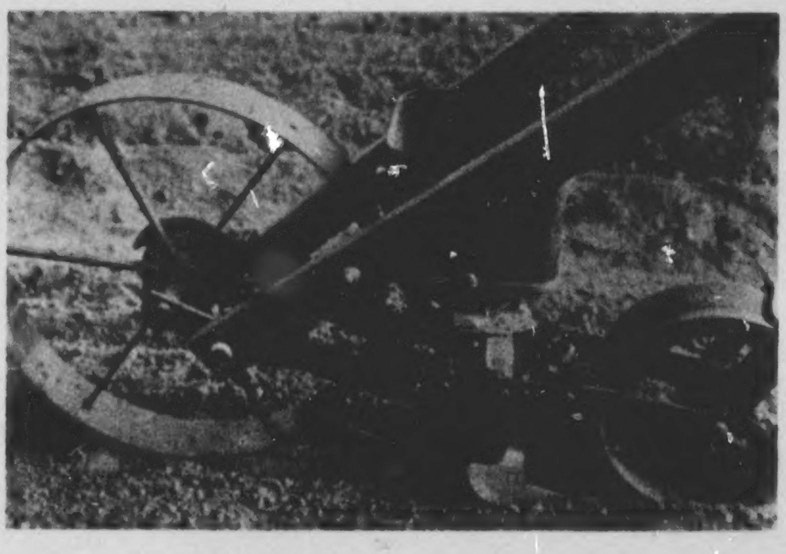


Figure 3-8. A small push-type vegetable seed planter used in home gardens.

Figure 3-9. A photograph of freshly planted rows planted with the planter above.

There are two types of fertilizer spreaders used to broadcast fertilizer in the home garden. The cart-type spreader is equipped with a slotted bottom and shutters. As the spreader is pushed, an agitator stirs the fertilizer to insure it reaches the shutters. Rate of application is governed by the size of the shutter opening. The second type of fertilizer spreader is the spinner type. This spreader works on the principle of centrifugal force. Fertilizer is metered through a shutter and onto a spinning wheel. Centrifugal force throws the fertilizer off the wheel and into a 180-degree area. This type of spreader distributes the fertilizer more quickly but is harder to calibrate. Both types should be thoroughly washed and oiled after use.

2. What power tools are needed for the home garden?

As garden size increases, the need for power-operated tools becomes obvious. These tools come in a wide range of horsepower from the small three-horsepower rotary tiller to thirty- to forty-horsepower farm tractors. The size of power tool needed depends upon the size of the garden. In many cases, the gardener may rent a rotary tiller or arrange for a tractor and disk to prepare the seedbed and make the rows. He then cultivates the garden using the tiller and a hoe.

The rotary tiller is probably the most common power tool used in the home garden. Most tillers are powered by a gasoline engine ranging in size from three to eight horsepower. Engine power is transmitted to the tines by means of belts, chains, or gear drives. The more expensive tillers have a transmission with a two- or three-speed forward drive and a reverse. The slashing action of the tines is an excellent means of pulverizing the soil and cultivating between the rows. This action will also incorporate fertilizer, herbicides, compost, and organic matter throughout the seedbed. Most tillers are provided with an implement bar to which shovels, sweeps, and furrowers can be attached to row-up the garden. Some models are equipped with removable tines to allow the width of cut to be widened or narrowed. One of the disadvantages of using a rotary tiller is that all models vibrate excessively and tend to quickly tire the operator.

During the past few years there has been an increase in the sale of lawn and garden tractors. Models range from modified riding lawn movers with six-horsepower engines to midget tractors complete with electric starter, hydraulic systems, and sixteen-horsepower engines. Depending upon horsepower rating and manufacturer, most models can be equipped with a full line of minature farm tools including disks, harrows, cultivators, planters and moldboard plows. These tractors can also be used as riding lawn mowers. Usually they cannot be used for cultivation between the rows after the plants have begun to grow. Prices range from $700.00 to $3,000.00, depending upon size, manufacturer, and available options.

3. What is required for maintenance and care of garden tools?

The life and usefulness of any tool or piece of equipment is dependent upon the care and maintenance it receives. All tools should be stored in a dry place to help prevent rust. A tub filled with sand which has been saturated with used motor oil will keep hand tools from rusting. Hoes and shovels should be sharpened periodically. A sharp, clean hoe or shovel is much easier to use. When sharpening hand tools, the gardener should try to retain the original level or cutting slope of the implement and should remove as little metal as possible. In sharpening hoes, the cutting edge should always be closest to the handle. (See Fig. 2-6) All tool handles should be checked regularly to maintain their tightness. Handles should be replaced when they are cracked. All cutting tools should be safely stored out of the reach of children.

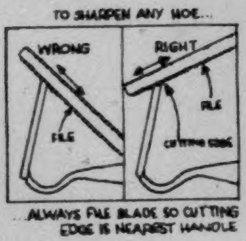


Figure 2-6

The garden sprayer should be thoroughly washed after each use. Spray materials should never be stored in the sprayer since this can cause corrosion and decay of rubber gaskets and metal. After washing, the pump mechanism should be removed and the sprayer hung upside down.

While the garden hose does not require maintenance, it should be properly stored by draining and hanging in some type of holder. The hose should never be stored in a place that exposes it to the sun and should never be left with the water pressure on for extended periods of time.

The proper maintenance and care of power tools cannot be over stressed. All implements have a service manual that should be thoroughly read and understood by the owner. These manuals are written by the engineers who design the implement and understand its abilities. Instructions in the manuals should be carefully followed for maximum service and operation. It is especially important that power tools be stored in a dry spot to prevent rain and weather damage.

4. What factors should be considered in using garden tools safely?

For safe use of hand and power tools the gardener should observe the following safety rules:

a. Use the tool only for its intended use.

b. Inspect the handles of hand tools to make sure the tool is securely attached.

c. Store sharp tools in a manner so that they will not be stepped on or obtained by small children.

d. Do not store chemicals in the sprayer. Mix only enough to use at one time.

e. Do not allow children to operate power equipment without adult supervision.

f. Do not attempt to service rotary-tiller tines without removing the sparkplug wire to prevent accidental cranking.

g. Do not refuel gasoline engines with the motor running. Stop the engine and allow the exhaust to cool.

h. Check bolts for tension on power tools to prevent vibration from working them loose.

i. Never allow hitchhikers on a tractor or its equipment.

j. Do not remove safety shields from power equipment.

k. Always be sure that the operator of power equipment is familiar with safety devices.

CHAPTER 4

THE GARDEN BLUEPRINT

A garden blueprint includes a detailed plan and a two-dimensional drawing to scale showing the way the garden will look when planted. The plan should indicate where the garden is to be located in the property and the length and width dimensions. Included are the width between rows, the number of rows, and the direction (north and south or east and west) of the rows. The plan will include information on kinds of vegetables, feet of row to plant, and planting dates. Just as a contractor would not consider constructing a building without a blueprint, the home gardener should always plan the garden on paper before beginning to construct a garden.

Several questions which are frequently asked about the garden blueprint include:

1. Why should the garden be planned on paper?
2. What vegetables should be included in the plan?
3. How many feet of row are needed for each selected vegetable?
4. Why should vegetables be selected according to seasonal maturity and plant height?
5. What is a rotation plan?
6. What factors should be considered in deciding distance between rows and distance between drills on row?
7. What factors should be considered in plant spacing in row and planting depth?

1. Why should the garden be planned on paper?

Serious and costly mistakes are often avoided when prior thought and planning are given to the kinds and amounts of vegetables to plant; where they should be located in the garden; when the harvest of one vegetable is expected; what vegetables should follow in order to have a year-round garden; and what spacing should be allowed between rows and between plants in the row. Unless you are an experienced gardener, all of the above questions should be answered and become a part of the garden plan.

2. What vegetable should be included in the plan?

A suitable procedure in determining the kinds of vegetables to include in the garden blueprint is to make a list of those vegetables which you like best and then arrange them in order of a "like-best" priority. Your FFA garden should contain at least 10 different kinds of vegetables. To this list of at least 10, add a minimum of 2 vegetables which are not familiar to you. A long list of vegetables is shown in Table 4-1 which you can use as a guide in making your selection. You will find a sample list in Table 4-2 of how an average family of 5 selected the vegetables to include in their garden. This sample selection is to be used as a guide only. Your final list should be based on your family likes and needs.

Table 4-1

Planting and Harvest Dates

The optimum months for planting each vegetable in the spring and fall garden are shown in the chart below. The first month shown indicates the approximate time for planting in the southern areas of the state with a lag in time progressing northward with the last month listed as the planting time for the northern area of the state. For example, cabbage would be planted in early February in south Mississippi and in March in northern Mississippi. Just the opposite applies to the fall garden. Cabbage would be planted in August in north Mississippi and in September in south Mississippi.

The first month shown in the harvest date for spring applies to south Mississippi with the second month to north Mississippi. The first month in harvest date for fall garden applies to north Mississippi with the second month applying to south Mississippi.

Vegetable	**Planting Date**		**Harvest Date**	
	Spring Garden	**Fall Garden**	**Spring Garden**	**Fall Garden**
Bean, snap and bush	Mar.-Apr.	August	May-June	Oct.-Nov.
Bean, snap and pole	Mar.-Apr.	July	May-June	Oct.-Nov.
Bean, lima and bush	Mar.-Apr.	August	May-July	Oct.-Nov.
Bean, lima and pole	Mar.-Apr.	July	May-July	Oct.-Nov.
Beet	Feb.-Mar.	Aug.-Sept.	Apr.-May	Oct.-Dec.
Broccoli	Feb.-Mar.	Aug.-Sept.	Apr.-May	Oct.-Dec.
Cabbage	Feb.-Mar.	Aug.-Sept.	Apr.-June	Oct.-Dec.
Canteloupe	Mar.-May	------	July-Aug.	------
Carrots	Jan.-Feb.	Sept.-Oct.	Apr.-May	Nov.-Jan.
Cauliflower	Feb.-Mar.	Aug.-Sept.	Apr.-May	Oct.-Dec.
Chard, Swiss	Feb.-Mar.	Aug.-Sept.	Apr.-May	Oct.-Dec.
Cabbage, Chinese	------	Sept.-Oct.	------	Nov.-Jan.
Collards	Apr.-June	------	July-Oct.	------

(cont'd)

Table 4-1 (cont'.d)

	Planting Date		**Harvest Date**	
Vegetable	**Spring Garden**	**Fall Garden**	**Spring Garden**	**Fall Garden**
Corn, sweet	Feb.-Mar.	July-Aug.	May-June	Oct.-Nov.
Cucumbers	Mar.-Apr.	July-Aug.	May-July	Oct.-Nov.
Eggplant	Mar.-Apr.	------	June-July	------
Lettuce	Jan.-Mar.	Sept.-Oct.	Apr.-June	Nov.-Jan.
Kohlrabi	Feb.-Mar.	------	Apr.-June	------
Mustard	Jan.-Mar.	Sept.-Nov.	Apr.-June	Nov.-Jan.
Okra	Mar.-Apr.	July	June-Aug.	Sept.-Nov.
Onion	Jan.-Feb. (plants)	October (seeds)	May-June	Apr.-May
Peas, English	Jan.-Feb.	------	Apr.-May	------
Peas, Southern	Apr.-May	July	July-Aug.	October
Pepper	Mar.-Apr.	June-July	June-July	Sept.-Oct.
Potato, Irish	Jan.-Feb.	July	June-July	October
Potato, Sweet	Apr.-June	------	Aug.-Oct.	------
Radish	Feb.-Apr.	Oct.-Nov.	Mar.-May	Nov.-Dec.
Rutabaga	Jan.-Feb.	July-Aug.	may-July	Oct.-Dec.
Spinach	Jan.-Feb.	Sept.-Oct.	Mar.-Apr.	Noc.-Jan.
Squash	Mar.-Apr.	July-Aug.	May-July	Sept.-Oct.
Tomato	Mar.-Apr.	June-July	May-June	Sept.-Nov.
Turnip		June-July	May-June	Sept.-Nov.
Watermelon	Jan.-Mar.	Sept.-Nov.	Apr.-June	Nov.-Jan.
	Mar.-Apr.	------	July-Aug.	------

Table 4-2

SAMPLE GARDEN PLAN

This vegetable list is based on a family of 5: mother, father and 3 children, ages 9, 12, and 15 with an average income. Their home is in Starkville, Mississippi.

Vegetable List Based on Preference of Family:

1. Tomato
2. Pepper
3. Cucumber
4. Beans, snap, bush & pole
5. Beans, lima, bush & pole
6. Okra
7. Peas, Southern
8. Greens, turnip, mustard, & spinach
9. Onions
10. Potato, Irish
11. Potato, sweet
12. Radish
13. Carrot
14. Beet
15. Corn, Sweet
16. Lettuce
17. Squash
18. Eggplant
19. Broccoli
20. Cauliflower
21. Cantaloupe
22. Watermelon
23. Cabbage

Top 10 Vegetables Based on Preference of Family *

1. Tomato
2. Pepper
3. Cucumber
4. Greens, turnips, mustard, & spinach
5. Beans, snap, bush & pole
6. Beans, lima, bush & pole
7. Okra
8. Squash
9. Onion
10. Broccoli

Less familiar vegetables—2 choices

11. Cabbage, Chinese
12. Kohlrabi

*Your list should be copied in column 1 in a form similar to Table 4-4.

3. How many feet of row are needed for each selected vegetables?

Plant only the feet of row of each vegetable which will be needed by your family, your friends and your neighbors and the amount you might sell. Without good planning you may easily overplant or underplant each kind of vegetable. The amount needed by your family is best determined by estimating the number of times during the year the vegetable would be served. Multiply this number by the number in your family. This will give the total number of servings. Assume that each serving for each family member would take 8 ounces or 1/2 pound. By multiplying the number of servings by 1/2 pound, you will obtain the pounds of the vegetable required for the family. Record the amount in a form similar to Table 4-3 in the column which refers to the pounds required by family use.

Table 4-3

"SAMPLE PLAN"

Feet of row required for each vegetable selected by family of 5 for year-round garden:

Vegetable	Number of Servings Fresh	Processed	Serving Total	Total serving for Family	Total lbs. Required For Family Use	Pounds to Sell	Feet of Row Required *
Tomato	60	30	90	450	225	0	80
Pepper	25	0	25	125	60	0	40
Cucumber	15	25	40	200	100	0	40
Greens	50	30	80	400	200	0	80
Beans, snap	25	25	50	225	115	0	120
Beans, lima	15	15	30	150	75	0	80
Okra	20	30	50	225	115	0	40
Squash	15	10	25	125	60	0	20
Onion	15	0	15	80	40	0	40
Broccoli	10	10	20	100	50	0	40
Cabbage, Chinese	5	0	5	50	25	0	20
Kohlrabi	5	0	5	50	25	0	20

***Refer to Table 4-4, Column 5, "Average Crop Expected per 100 ft."**

The limited selection of vegetables in this Table should serve only as a guide for you. The feet of row were restricted in order to fit a 1000-sq. ft. garden, 25' x 40". (See sample spring and fall garden in Figures 4-1 and 4-2).

Refer to "Sample Plan" form in Table 4-3. This family estimated that they would serve tomatoes about 90 times during the year with 60 servings as fresh and 30 servings as canned. Since there were 5 in the family and all liked tomatoes, a total of 450 servings (5 x 90 = 450) was required. An 8-ounce or 1/2-pound serving per person is generally too much but for planning it is a good number to use. Thus, 8 ounces x 450 servings gives a requirement of 225 pounds of tomatoes.

How did the family of 5 determine the number of plants required to yield 225 pounds? Turn to Table 4-4 and look at column 5 entitled "Average Crop Expected per 100 feet." Under tomatoes, it states that an average yield of 125 pounds can be expected from a 100-ft. row. This family felt that they could obtain a yield above the average and finally decided on 80 feet of row. The total garden area was small and space was needed for other vegetables. They followed a similar procedure in determining the feet of row required for the other vegetables, using Table 4-4 as a guide.

Table 4-4

Planting Guide

Vegetables	**Seeds or Plants per 100 ft.**	**Depth of Seed Planting in Inches**	**Distance in Inches Between Plants**	**Average Crop Expected per 100 ft.**	**Days to Harvest**
Asparagus	66 pl., 1 oz.	6 to 8, 1 to 1 1/2	18	30 lb.	2 yr.
Beans, snap bush	1/2 lb.	1 to 1 1/2	2 to 3	50 lb.	50
Beans, snap pole	1/2 lb.	1 to 1 1/2	4 to 12	80 lb.	65
Beans, Lima bush	1/2 lb.	1 to 1 1/2	2	25 lb. shelled	75
Beans, Lima pole	1/2 lb.	1 to 1 1/2	3	50 lb. shelled	80
Beets	1 oz.	1	2	75 lb.	65
Broccoli	1/4 oz.	1/2	14 to 24	50 lb.	70
Cabbage	100 pl., 1/4 oz.	1/2	12	150 lb.	65
Cabbage, Chinese	1/4 oz.	1/2	8 to 12	100 lb.	75
Cantaloupe	1 oz.	1	36 to 48	100 frts.	90
Carrot	1/2 oz.	1/2	2	100 lb.	75
Cauliflower	1/4 oz.	1/2	14 to 24	80 lb.	60
Chard, Swiss	2 oz.	1	6	75 lb.	50
Collard (Kale)	1/2 oz.	1/2	8 to 16	150 lb.	55
Corn, sweet	3 to 4 oz.	1 to 2	12	10 doz.	80
Cucumber	1 oz.	1	12 to 18	100 lb.	55
Eggplant	50 pl., 1/8 oz.	1/2	18 to 24	100 lb.	85
Kohlrabi	1/8 oz.	1/2	3 to 4	75 lb.	55

(cont'.d)

Table 4-4 (cont'.d)

Vegetables	Seeds or Plants 100 ft.	Depth of Seed Planting in Inches	Distance in Inches Between Plants	Average Crop Expected per 100 ft.	Days to Harvest
Lettuce, head	1/2 oz.	1/2	12	75 head	80
Lettuce, leaf	1/2 oz.	1/2	4	50 lb.	50
Mustard	1/2 oz.	1/2	1 to 2	100 lb.	50
Okra	2 oz.	1	18	70 lb.	65
Onion (plants)	400 to 600 pl.	1 to 2	2 to 4	100 lb.	130
Onion (seed)	1 oz.	1/2	2 to 4	100 lb.	200
Parsley	1/4 oz.	1/8	4 to 6	30 lb.	90
Peas, English	1 lb.	2	1 to 2	40 lb.	65
Peas, Southern	1/2 lb.	2	4 to 6	80 lb.	75
Pepper (sweet)	50 to 66 pl., 1/8 oz.	1/2	18 to 24	50 lb.	75
Potato, Irish	6 to 10 lb.	4	9 to 12	100 lb.	100
Potato, sweet	75 to 100 pl.	3 to 5	12 to 16	100 lb.	120
Pumpkin	1/2 oz.	1 to 2	36 to 48	100 lb.	110
Radish	1 oz.	1/2	1	40 lb.	25
Rutabaga	2 oz.	1/2	6 to 10	90 lb.	110
Spinach	1 oz.	1/2	3 to 4	40 lb.	45
Squash, summer	1 oz.	1	18 to 36	150 lb.	55
Squash, winter	1/2 oz.	1	24 to 48	100 lb.	90
Tomato	50 pl., 1/8 oz.	4 to 6, 1/2	18 to 36	125 lb.	80
Turnip, greens	1/2 oz.	1/2	2 to 3	50 to 100 lb.	50
Turnip, roots	1/2 oz.	1/2	2 to 3	50 to 100 lb.	60
Watermelon	1 oz.	1 to 2	36 to 72	40 frts.	85

Prepared by Milo Burnham, Extension Horticulturist
with cooperation of MAFES Horticulturists

Information Sheet 504

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You should develop a form similar to that in Table 4-3. Determine the approximate pounds of each vegetable required to serve your family and also the amount required for sale and the feet of row required to produce this amount.

4. Why should vegetables be grouped according to seasonal maturity and plant heights?

When vegetables mature and are harvested, the residual plant material should be removed and the soil area should be prepared for replanting. If vegetables are grouped by seasonal maturity, replanting will be on rows adjacent to each other rather than on rows all over the garden. Table 4-1 indicates normal planting and harvest dates for a long list of vegetables. A little thought and planning as to where to locate each kind of vegetable in the garden will make it easier to maintain the garden. When the rows in the garden run east and west, please keep in mind that tall plants such as sweet corn, okra and pole beans should be planted on the northern area of the garden to prevent shading of smaller vegetables. In fact, in consideration of seasonal maturity, the vegetables should be arranged in the garden with the smaller kinds on the south rows ranging to the taller kinds on the north rows. The sample garden plan, Figure 4-1, has grouped vegetables according to seasonal maturity and plant height. Note that okra, tomatoes and peppers are on the rows to the north with the small kinds of vegetables on rows to the south.

This sample garden plan or "blueprint" was developed by referring to Table 4-5 entitled. "Information Planting Chart for Sample Garden." You will need to develop a chart similar to this to make a plan (blueprint) for your garden. Again, Table 4-4, Planting Guide, prepared by Dr. Milo Burnham, Extension Horticulturist, can be used as your guide for information about each selected vegetable.

Table 4-5

INFORMATION PLANTING CHART FOR SAMPLE GARDEN

Preferred Vegetable	Feet of Row Required	Distance Between Rows	Distance Between Plants in Row	Planting Date Spring	Planting Date Fall	Harvest Date Spring	Harvest Date Fall	Seed/Plants Required
Tomato	80′	36″	30″	April	July	July	Oct.	30 plants
Pepper	40′	36″	24″	April	July	June	Sept.	20 plants
Cucumber	40′	36″	12″	April	July	June	Oct.	1/2 ounce
Greens (mustard, (turnip)	80′	36″ (2 drills)	1″	Feb.	Oct.	April	Nov. Dec.	1/2 ounce
Beans, snap	140′	36″	2″	April	Aug.	June	Oct.	1/2 lb.
Beans, lima	80′	36″	2″	April	Aug.	June	Oct.	1/2 lb.
Okra	40′	36″	18″	April		June Oct.	Sept.	1 ounce

(cont'.d)

(cont'.d) Table 4-5

INFORMATION PLANTING CHART FOR SAMPLE GARDEN

Preferred Vegetable	Feet of Row Required	Distance Between Rows	Distance Between Plants in Row	Planting Date		Harvest Date		Seed/Plants Required
				Spring	Fall	Spring	Fall	
Squash	40'	36"	24"	April	July	June	Oct.	1/2 ounce
Onion	40'	36" (2 drills)	3"		Oct.	April May		1/2 ounce
Broccoli	40'	36"	12"	Mar.	Aug.	May	Oct. Nov.	1/4 ounce
Cabbage, Chinese	20'	36"	12"		Sept.	April	Jan.	1/8 oz.
Kohlrabi	20'	36"	4"	Mar.		May		1/16 oz.

5. What is a rotation plan?

Gardening is generally thought of as a spring and early-summer project. However, gardening can be highly profitable the year round. In fact, spring gardening is easier when following fall and winter gardening. The soil is generally maintained in a better condition and weed control is easier. More important, of course, is the additional amount of vegetables harvested from the same garden area. Thus, a rotation plan means planting another vegetable as soon as a particular spring-planted vegetable is harvested. You may think of a rotation garden as a fall garden. An example of a rotation plan is shown in Figure 4-2.

6. What factors should be considered in deciding distances between rows and distances between drills on the row?

(a.) Distances between rows: The kinds of equipment used in preparing the soil, planting and cultivating will determine to the greatest extent the distances between rows. When tractors and tools used in growing farm crops such as soybeans and cotton are used in the garden, it is more practical to keep the distances between rows the same as for the field crops which is generally 40 inches. However, if the garden rows are prepared by hand-tools and weeds are controlled by mulching and hand weeding, the distances between the rows should depend on the kind of vegetable. Vegetables which grow to large sizes, such as tomatoes, potatoes, okra, corn, pole beans, and vine crops, should be planted on rows at least 36 inches apart. However, smaller kinds of vegetables, such as greens, radishes, carrots, beets, and other

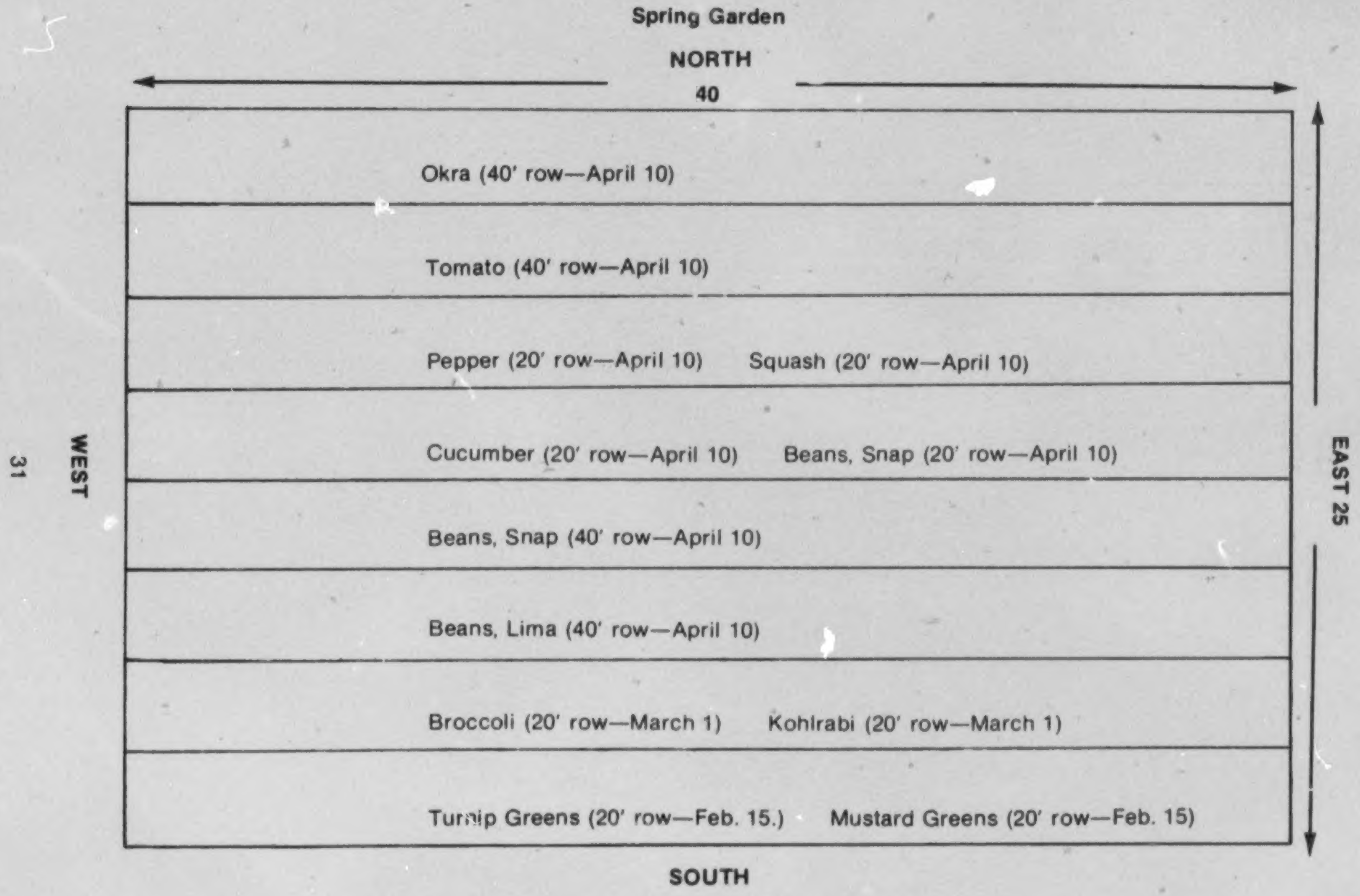
Spring Garden
NORTH
40
Okra (40′ row—April 10)
Tomato (40′ row—April 10)
Pepper (20′ row—April 10)
Squash (20′ row—April 10)
Cucumber (20′ row—April 10)
Beans, Snap (20′ row—April 10)
Beans, Snap (40′ row—April 10)
Beans, Lima (40′ row—April 10)
Broccoli (20′ row—March 1)
Kohlrabi (20′ row—March 1)
Turnip Greens (20′ row—Feb. 15.)
Mustard Greens (20′ row—Feb. 15)
WEST
31
EAST 25
SOUTH

Figure 4-1

Fall Garden

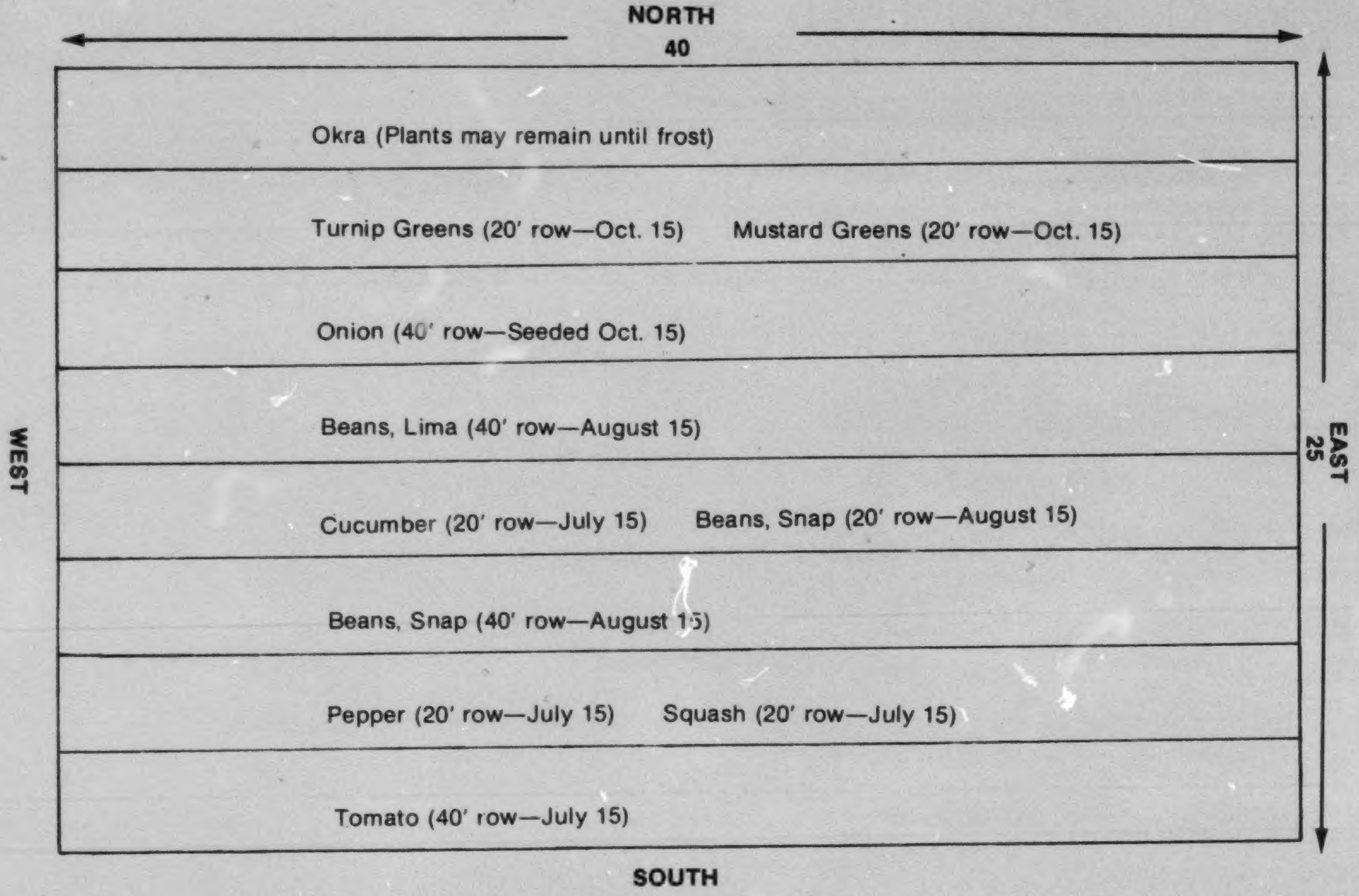
NORTH
40
Okra (Plants may remain until frost)
Turnip Greens (20' row—Oct. 15)
Mustard Greens (20' row—Oct. 15)
Onion (40' row—Seeded Oct. 15)
Beans, Lima (40' row—August 15)
Cucumber (20' row—July 15)
Beans, Snap (20' row—August 15)
Beans, Snap (40' row—August 15)
Pepper (20' row—July 15)
Squash (20' row—July 15)
Tomato (40' row—July 15)
WEST
EAST
25
SOUTH

Figure 4-2

vegetables of similar size may be planted on rows spaced 1 foot apart. Thus, the distances between rows in the garden depends on the kinds of machines and tools used in preparing the rows and the kind and size of vegetables. The family with the sample garden decided on a spacing of 36 inches between rows.

(b.) Distances between drills on row: It is sometimes an advantage with certain vegetables such as greens, radishes, carrots, beets, lettuce, and other small growing vegetables to plant 1 or more rows (drills) on a wide row (bed). Generally, the drills on the bed should be minimum of 12 inches to allow cultivating between the drills. The family with the sample garden decided to plant only 1 drill for each row. The distances indicated in the sample garden were based on the experience of a family and information in Table 4-4.

7. What factors should be considered in plant spacing within the row and planting depth?

(a.) Plant spacing within the row: Generally, the larger the plant at maturity, the greater the spacing between the plants in the row. Table 4-4 has a column which shows the optimum spacing between plants in the row for several kinds of vegetables. This Table is a good guide for determining these distances when planting and thinning the various vegetables in your garden. If you should plant a vegetable not listed in the Table, pick a vegetable of similar size and plant growth habit and use the distance indicated for it.

(b.) Planting depth: It is most important that an excellent emergence of plants be obtained. Depth of planting is important in assuring a good stand of plants. Table 4-4 indicates the optimum depths to plant seeds of several kinds of vegetables. Refer to this Table when planting your garden.

CHAPTER 5

SELECTION OF VEGETABLE VARIETIES

Thought should be given to the choice of the vegetable varieties to plant in the garden. Some varieties are more productive than others. This often occurs because certain varieties may be better adapted to the soil and climate of the area or may be more resistant to diseases and pests.

Several questions which arise when deciding on varieties for the garden are:

1. What varieties are adapted to your area?

2. What is meant by the term "recommended varieties"?

3. What are the personal preferences of the family?

4. Why should consideration be given to ease of harvesting and processing?

5. What quality characteristics should be considered in selecting vegetables for fresh or processed use?

6. What plant growth characteristics should be considered in selecting varieties?

1. What varieties are adapted to your area?

A list of the vegetable varieties which have been grown in gardens and commercial fields in your area should be developed. Contact the better gardeners, commercial farmers, and seed dealers. Get as much information as possible concerning the productivity of each variety.

2. What is meant by the term "recommended varieties"?

The Agricultural Experiment Station and the Cooperative Extension Service publish each year a list of varieties of vegetables which are recommended for Mississippi gardeners. If the variety appears to be better suited to a specific area of the state, this is usually stated. You should obtain a copy of the recommended varieties and compare these with the list you developed based on the adaptation to your area. (See Appendix E)

3. What are the personal preferences of the family?

Some varieties will be familiar to you as a result of previous gardening experience or with study of seed catalogs or advertisements. In consideration of your experiences, study the list you developed based on varieties adapted to your area and those recommended by the University and develop a further list taking into account your experiences and study.

4. Why should consideration be given to ease of harvesting and processing?

Varieties differ in ease of harvesting and in preparation for processing. For example, okra pods or fruit of some varieties break from the plant easier than other varieties. This is often true with bean and tomato varieties. In addition, certain varieties of Southern peas shell easier in preparation for canning and freezing. When consideration is given to the ease of harvesting of a variety of vegetables there can be a substanial reduction in labor.

5. What quality characteristics should be considered in selecting vegetables for fresh or processed use?

Vegetables are a good source of vitamins, minerals, and carbohydrates. In some cases, such as beans and peas, vegetables are a good source of proteins. Some varieties of a particular vegetable may be a better source of vitamins, minerals, carbohydrates, or proteins. Thus, careful study of the nutrition of varieties would be helpful in making the final selection. Also, some varieties of a particular vegetable may differ greatly after preparation for the table. Some varieties can withstand the canning, freezing, and drying processes better than others. Even differences in boiling, frying, and/or baking may occur between varieties of a particular vegetable. There can be differences in moisture content, in pH value, and particularily in color.

6. What plant growth characteristics should be considered in selecting varieties?

There can be great differences in the plant growth habits between varieties of vegetables. There are bush-type and pole-type snap beans and lima beans. There are dwarf and large-type tomato varieties as well as small-fruited and large-fruited varieties. Similar examples can be given for okra, sweet potatoes, cucumbers, and possibly others. In addition, there are extreme differences in the size, shape and color of leaves and fruit. These differences may be important with regard to growth in the garden, for harvesting, preparation for processing, and preparation for eating. If so, these characteristics should be given consideration in choosing the final variety to plant in the garden.

CHAPTER 6

SELECTION AND ORDERING OF GOOD SEED

A good stand of healthy vegetable plants results only when good seed are planted. It is imperative that you, as gardener, purchase the best seed available. To insure that you plant good seed in your garden, you should seek the answer to the following questions:

1. What are the characteristics of good seed?

2. What effect does the location of seed production have on the quality of the seed?

3. What quantity of seed is needed for each vegetable?

4. What precautions should be followed in saving seed from your garden for future planting?

5. What are the proper methods of seed storage?

6. Why should seed be treated?

7. What items should be included in a seed order?

1. What are the characteristics of good seed?

There are 4 main characteristics which should be considered to be certain seed are good.

a. True to variety name. Don't take a chance on planting seed or plants in your garden unless you are reasonably sure the variety is true to name. If you doubt purity, then dispose of the seed and obtain seed which you know is true to variety name.

b. Viable. The seed must be alive to germinate and emerge as a healthy plant. Unless you plant seed with strong viability you will not obtain a good stand. The germination percentage of a lot of seed should be known so that you could expect good emergence.

c. Free of other kinds of seeds. You will have sufficient weeds to contend with in your garden without planting other type seed. In fact, weeds which are difficult to control and other plants may be introduced in the garden area unless you are sure that the variety of seeds is free of other kinds of seed.

d. Free of diseases and insect injury. Diseases are often carried on the seed. You should be familiar with the diseases of vegetables which may be carried on the seed and how these seed may be treated to prevent or control these diseases. Also, seed may be injured by insects, particularily weevils. This injury can greatly affect the germination percentage and vigor of a large precentage of seed.

2. What effect does the location of seed production have on the quality of seed?

Where the seed is produced is important for some vegetables, particularly Irish potatoes, snap beans, and lima beans. Irish potato tubers are carriers of virus diseases which will infect the plants. It is necessary to plant only certified Irish potato tubers grown in northern states. Snap and lima bean seed are carriers of diseases which will cause damage to the plants following germination. The western states, such as California, Idaho and Colorado can produce disease-free seed because of their dry climates. The climate of Mississippi is too moist during the production season to produce disease-free seed. When buying certain kinds of seed, careful consideration should be given to where the seed were grown to reduce the hazard of diseases.

3. What quantity of seed is needed for each vegetable?

There is no need to purchase seed that is not needed for planting. Excess seed will either need to be stored or thrown away. For these reasons, you should refer to the planting chart when preparing your seed order and purchase only the amount of seed needed for each vegetable.

4. What precautions should be followed in saving seed from your garden for future planting?

The first consideration in saving seed from the garden should be the concern that the seed will be good. Refer again to the characteristics of good seed. Mainly, the seed should be viable, true to variety name, and disease free as well as being storable. The greatest danger of saving your own seed will be its trueness to variety. It is extremely easy for varieties to become mixed in the garden, particularily those varieties which are cross pollinated by bees and wind. Also, hybrid varieties do not breed true to name. The seed of hybrids should not be saved.

5. What are the proper methods of seed storage?

Temperature and humidity (moisture in the air) are the two main considerations in storage of seed. Generally speaking, the cooler the temperature (but above freezing) and the lower the humidity (50 percent or lower) the better seed will store. Dry, refrigerated storage is recommended for most seed which is carried from one planting season to the next.

6. Why should seed be treated?

When a seed germinates, the root and developing stem are subject to disease and insect injury. The seed can be treated with a fungicide and insecticide mixture which will aid in controlling injury from diseases and insects. Also, seed which are placed in storage for the next planting season may be injured by certain diseases and insects. A mixture of a fungicide and insecticide would help to avoid this injury.

7. What items should be included in a seed order?

A sample seed order is shown in Table 6-1. Whenever possible, the seed should be secured from the local seed store. However, if there is any doubt about the purity of the variety or the viability of the seed, then you should order from an alternate source. A partial list of seed companies that publish catalogues is included for your convenience in Appendix F.

Table 6-1

SEED ORDER FORM

(Based on Sample Garden Plan, Table 4-2.)

Vegetable	Variety	Quantity	Unit Price	Total Price
Tomato	Marion	75 plants	.10	7.50
Pepper	Miss Belle	70 plants	.10	7.00
Cucumber	Ashley	1 ounce	1.10	1.10
Greens, turnip	Seven Top	2 ounces	.20	.40
Beans, snap	Highlander	2 pounds	1.00	2.00
Beans, lima	Henderson	2 pounds	1.00	2.00
Okra	Clemson Spineless	6 ounces	.60	3.60
Squash	Yellow Straightneck	1 ounce	.35	.35
Onion	Yellow Bermuda	1/2 ounce	.45	.45
Broccoli	Spartan	1/2 ounce	.60	.60
Cabbage, Chinese	Michihli	1/8 ounce	.25	.25
Kohlrabi	White Vienna	1/16 ounce	.25	.25

CHAPTER 7

TRANSPLANTING VEGETABLES

Many vegetable crops are often transplanted. That is, the plants may be started either indoors or in sheltered areas and the young seedlings then moved from this area to the garden area. The most common reason for transplanting vegetables is to increase the earliness of the crop. Crop earliness can be increased by 4 to 6 weeks simply by starting the seed indoors and transplanting to the garden area. With the increasing cost of vegetable seed, this is a means of conserving seed. This is particularly true with the most expensive hybrid vegetables. In some cases, the sweet potato for example, transplanting is the only feasible means of propagating the crop.

In determining whether to transplant, there are several questions that the gardener should be able to answer first:

1. What vegetables are suitable for transplanting?

2. What equipment and materials are necessary to grow transplants?

3. What are the advantages of commercially-grown transplants as opposed to homegrown transplants?

4. Why is it necessary to sterilize soil for growing transplants?

5. What procedures are involved in seeding transplants?

6. What are the procedures involved in transplanting the seedling?

7. What is the length of time required between planting the seed to transplanting in the garden?

8. What are the methods of hardening transplants?

1. What vegetables are suitable for transplanting?

Most vegetable crops can be transplanted; however, it is not necessarily desirable to transplant many of them. Major considerations in determining which vegetables are suitable for transplanting should be given to the anticipated value of the crop to be produced and the increased cost of producing that crop. Another factor that should also be considered is the ease with which the crop may be transplanted. Some crops are transplanted very easily, tomatoes for example, as compared to others, such as beans or cucumbers. Although these latter 2 crops can be transplanted, the care required is much greater. In order to successfully transplant beans or cucumbers, the gardener must be much more careful and the advantage in earliness gained would be very marginal. On the other hand, tomatoes can be handled with a little less care and the advantage in earliness would be in the neighborhood of 4 to 6 weeks. The vegetable crops that are most often transplanted include cabbage, broccoli, cauliflower, tomatoes, peppers, onions, and sweet potatoes. Crops which are occasionally transplanted include head lettuce, cantelopes, and watermelons.

2. What equipment and materials are necessary to grow transplants?

In order to make the production of transplants worthwhile, the gardener must have access to an area that is protected from the lower temperatures that prevail in the open and is readily accessible to sunlight and water. In addition, he must have flats or other containers in which to start the seed and he must have access to a source of good soil. A small greenhouse, hotbed, or cold frame may be used to start most vegetable seeds. However, most home gardeners would not have access to these types of plant-growing structures. Small lots of plants may be started indoors in a sunny window area in flats or in pots. Another means of accomplishing the same purpose would be to have a sheltered place outside, such as a bed prepared against the southern side of a building and covered with a piece of clear plastic. This would provide protection and increase earliness in many instances. To successfully grow transplants, a gardener must have an area in which he can control temperature satisfactorily, a ready access to water, a fertile, sterile soil and an area that is easily ventilated. He must have either pots or flats (small pans wtih drainage holes in the bottom) in which the soil may be placed and which can be easily moved from one area to another. (See Figures 7-1 and 7-2)

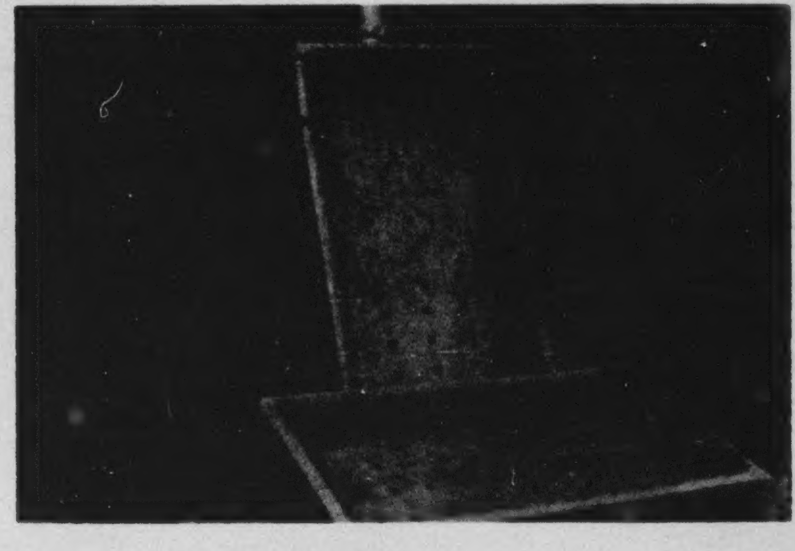

Figure 7-1

Flats made of galvanized metal and suitable for starting seed indoors or in hotbeds, greenhouses, etc. Note the holes in the bottom for drainage.

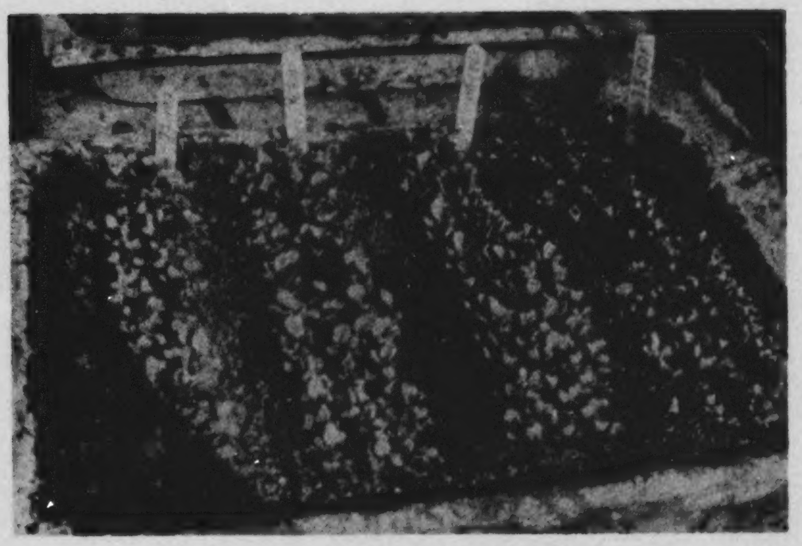

Figure 7-2

Young seedlings growing in a metal flat. These seedlings are about ready to transplant to individual containers.

3. What are the advantages of commercially-grown plants as opposed to homegrown plants?

In most states, commercially-grown plants must be inspected by state plant-board people and certified as being free from insects and diseases. In homegrown plants, it is up to the gardener to be sure that his plants are free of insects and diseases. In general, commercially-grown plants are grown by people that are in the business for this purpose and they are equipped to handle plants in such a way so as to insure that the plants are of good quality and well hardened. Oftentimes producers of small lots of homegrown plants are not equipped to insure proper growth and hardening of transplants. Commercially-produced plants often may be available at a price lower than , or at least highly competitive with, plants grown by small producers in the local area, or the home gardener. A slight advantage perhaps in favor of homegrown plants is that you know what you have. However, if you make it a practice to obtain transplants from reputable sources, then this advantage would be eliminated.

4. Why is it necessary to sterilize soil for growing transplants?

The period during which the seed is germinating, the young seedling emerges and the development of the first 2 or 3 leaves, is probably the most vunerable period in the plant's life. There are numerous fungi and bacteria found in the typical garden soil that can cause serious disease problems with the young seedlings. The tissues of the young seedling are very tender and it is not difficult for most of these organisms to puncture the outer area of tissue and gain entrance into the young seedling, and once inside it multiplies rapidly and can cause serious stunting or death of the plant.

Chemical protectants can be used to provide a measure of protection against these organisms. The only way to insure freedom from these organisms is by sterilization. There are several chemicals that may be used to sterilize soils. These must be used in accordance with label directions however, and care should be taken because in many cases a waiting period must lapse between treatment and planting. Another method that is equally satisfactory is heat sterilization or pasteurization of the soil. This can be done with steam or by placing small amounts of soil in the oven and heating the soil to about 200° F.

5. What are the procedures involved in seeding transplants?

The soil used should be relatively fertile, smooth, medium to fine textured, and free of lumps and foreign matter, such as small stones, trash, etc. The sterilized soil should be filled into the pots or flats and lightly firmed. The soil should be moist, but not wet. If seeding into individual pots of 1-1/2 to 2 inches in diameter, small holes should be made near the center for placing the seeds. Two to 3 seeds should be placed in each pot and covered lightly with the soil. If seeding into flats, the flats should be marked off into rows, approximately 3 to 4 inches apart. Very shallow trenches are made and the seed distributed uniformly in these trenches. If the plants are to remain in these flats until time to move them to the garden, they should be spaced so that the plants will be about 1-1/2 to 2 inches apart in the row. The depth of planting the seed will vary, depending on the kind of vegetable, but a general rule of thumb is 1-1/2 to 2 times the diameter of the seed. The seed should be covered with the soil, lightly firmed, and carefully watered using either a fog nozzle or covering the flat or containers with cheesecloth and watering so as to prevent washing the seed from the soil. If the seed are to be pricked-off and transplanted to pots before going to the garden, they can be sown somewhat thicker and other care procedures would be quite similar to those described above.

6. What are the procedures involved in transplanting the seedlings?

There are 2 types of transplanting that are involved:

A. "Pricking-off" or indoor transplanting; and

B. Transplanting to the out-of-doors.

For pricking off, or indoor transplanting, seeds are normally sown rather thickly and after emergence the young seedlings are transplanted to individual pots where they will continue to develop prior to moving to the garden. The soil should be somewhat similar to the soil used in planting the seed, except possibly a little more fertile. Again, it should be relatively sterile. The soil should be filled into the pots and firmed, and it should be moist, but not wet. Small holes should be made in the soil as near the center of the individual pots as possible. The holes may be made with something like a pencil or a tool made especially for this purpose. The young seedlings then should be lifted carefully so as to minimize injury to the root system. The soil should be slightly loosened around the root system and the plants separated and placed individually in each pot. (See Figure 7-3) The soil should be firmed around the root system of the young seedling and the seedling watered. For best results, transplanting should be done in the late afternoon or early evening hours so as to avoid exposure to strong sunlight immediately following the transplant operation. The young seedlings should be handled by the cotyledonary leaf, or seed leaf, as much as possible to prevent damage to the stem and root system.

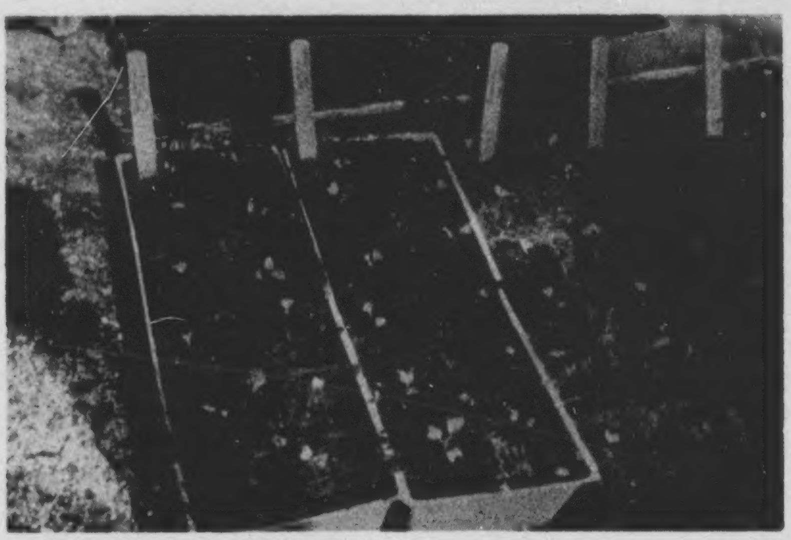

Figure 7-3

Young seedlings just transplanted to individual containers. The plants will be ready for the garden in about 3 to 4 weeks.

In transplanting to the open, there are 2 types of transplanting described here. One is referred to as "bare-rooted," and the other as "potted." Prior to transplanting to the out-of-doors, the plants should have been thoroughly "hardened." The garden row should be well prepared and the soil should be moist, but not wet. The plants should be spaced in the row as they are to remain during the plants' development. A string should be used to mark off the rows so that the plants are as nearly in line as possible. This will facilitate later cultivation and other cultural practices.

If the transplants are being transplanted bare-rooted, holes should be dug for the individual plants. They should be placed in the holes, the root system covered lightly with soil, and watered thoroughly. Then the hole should be filled to the point so that the seedling is slightly lower, or deeper, in the soil than it was in the original seedbed. The soil should be firmed well around the root and adequate moisture maintained for plant growth. If the transplants are in pots, they may be planted directly into the garden by a method similar to that used for bare-rooted plants, or a furrow may be opened in the garden and the plants lined up in the furrow and the soil filled in around the pots, provided the pots are of a material such as peat. If the plants are in clay pots or metal containers they should be gently knocked from the container and lined up and the soil filled in around them. The plants should then be watered well and good soil moisture conditions maintained. Again, best results will be obtained if transplanting is done in the late afternoon or early evening hours. If transplanting is done during summer months, it may occasionally be necessary to protect the young transplants from the direct rays of the sun for a few days.

7. What is the length of time required from planting the seed to transplanting in the garden?

The length of time required for transplant growth will vary depending on the crop being transplanted. It requires from 6 to 8 weeks to produce tomato plants for transplanting to the open garden. A crop such as melons or cantelopes is normally transplanted at the end of about 2 to not more than 3 weeks. Peppers will require a slightly longer period than tomatoes, generally about 10 weeks. The prevailing temperatures at which the plants are grown will affect the length of time required to produce satisfactory transplants.

8. What are the methods of hardening transplants?

Transplants are hardened by controlling the water supply and the temperature to which the plants are subjected. This is usually accomplished by withholding water and subjecting the plants to lower temperature over a period of 10 days to 2 weeks. The water is withheld to the point that the plant may wilt slightly during the day, and the temperature is gradually lowered from that used during the early growth stages of the transplant. This gradual lowering should reach the point so that the plant will be subjected for several days to temperatures slightly below what would normally be expected to occur outside. If plants are being transplanted under mid-summer conditions, they also need to be hardened. They will have oftentimes been produced under subdued light conditions. The plants are gradually subjected to more intense sunlight and slightly higher temperatures to harden them so that the plants become acclimated to temperatures that would be expected to occur outside. The hardening process should be spread over a 10-day to 2-week period with slight modifications in temperatures occuring each day. Following transplanting, the young transplants should be protected as much as possible from rapid air movement because this increases the rate at which moisture is lost from the plant and transplanting damages the root system and hence limits the rate at which the plant may absorb moisture.

CHAPTER 8

Planting the Garden

The typical garden is planted over a period of several days, or in some cases, several months. Some crops are best suited to cool-season growing conditions and hence are referred to as either early-spring or late-fall crops. Others grow and do better in warm summer temperatures and planting should be adjusted accordingly. You must have some knowledge of the temperature requirements of the various crops prior to planting them to enable you to better determine when to plant. The garden should never be planted when the soil is excessively wet. At the same time, it should not be planted when the soil is dry or powdery. Most vegetables should not be planted in soils in which the temperature is below 50-55° F.

In deciding when and how to plant the garden, the following questions should be answered:

1. What are the methods and procedures of seedbed preparation?

2. When should fertilizers be added?

3. When should chemical weed-control measures be used?

4. What are the methods of opening the seedbed and insuring the proper depth of planting?

5. What are the methods of seeding and transplanting?

1. What are the methods and procedures of seedbed preparation?

How the seedbed is prepared is going to be determined, to a large extent, by the equipment the gardener has available . However, certain factors should be considered and the end results should be somewhat similar. If the seed are to be planted in winter or early spring when moisture conditions are normally quite high, the seedbed should be relatively high. (See Figure 8-1.) If planting is in the late spring or summer when moisture is somewhat lower, the seedbed or row may be more nearly flat or closely approaching field level. The soil should have been broken to a depth of from 6 to 8 inches and all clods or large particles broken into smaller sizes. Large residues from previous crops, sticks and large stones, should be removed from the garden area or seedbed. The seedbed should never be prepared when the soil is excessively wet. This will cause puddling, breakdown of the soil profile, and crusting, all of which are undesirable in vegetable production.

The garden area should be "made-up" into rows, the height and width governed by the crop, the time of year, and the equipment available for the care of the garden. If possible, the seedbed preparation should be completed a week or 10 days in advance of the anticipated planting date. This will allow time for the soil to settle and, hopefully, to receive some rainfall and improve soil-moisture conditions.

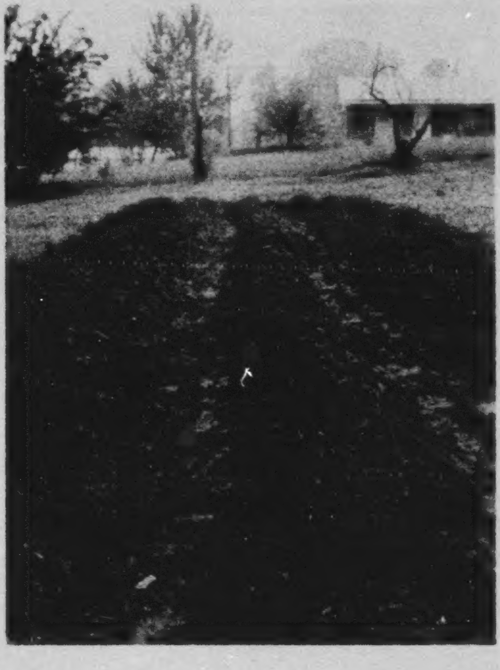

Figure 8-1

The prepared seedbed ready for the final planting steps.

2. When should fertilizers be added?

When fertilizers are being used in excess of 1,000 pounds per acre, approximately 50 percent of the fertilizer should be applied broadcast during the initial soil-breaking steps. The remainder of the complete fertilizer should be added during the final stages of seedbed preparation. Fertilizer should be placed and the soil bedded or ridged on top of the fertilizer so that the fertilizer is near the center of the prepared seedbed. Some crops require a side-dress application of nitrogen. This is accomplished after the crop is up and growing well.

3. When should chemical weed-control materials be used?

The application of weed-control chemicals is governed largely by several factors:

A. The crop grown;

B. The time of year; and

C. The chemical being used.

There is no one chemical that is safe to use on all vegetables grown in the garden. Most of the chemical weed-control materials can be used only on a very few of the vegetable crops with any measure of safety.

In order to get good weed control, some chemicals must be incorporated into the top 1 inch or 2 inches of soil. These chemicals are normally applied in the final stages of seedbed preparation. Some chemicals are more effective when they are applied immediately after planting the crop, but prior to crop emergence. Other weed-control chemicals cannot be safely used until the crop is well established. Always read the label directions for the use of weed-control chemicals and **follow these directions carefully.** Failure to do so may result in serious crop damage and, in many cases, complete crop loss. Do not use chemicals at a rate in excess of the recommended rate.

4. What are the methods of seeding and transplanting?

In the typical small home garden, seeding is normally done by hand or by the use of small hand-operated planters. Transplanting in the home garden is normally a hand process, although there are transplanting machines available that are designed to control seeding rate and seeding depth. These planters normally open a small furrow, drop the seed, and cover the seed and firm the soil over the seed in one operation. In hand-planted operations, it is necessary to open the seedbed with a tool of some type, drop the seed, then cover them by hand or with a rake or hoe, and firm the soil on top of the seed. (See Figures 8-2, 8-3, and 8-4.) Transplanting into the garden was discussed in Chapter 7 under item 6.

Regardless of the time of year or method of planting, though, soil moisture must be adequate for seed germination and seedling emergence. At the same time, soil moisture should not be excessive.

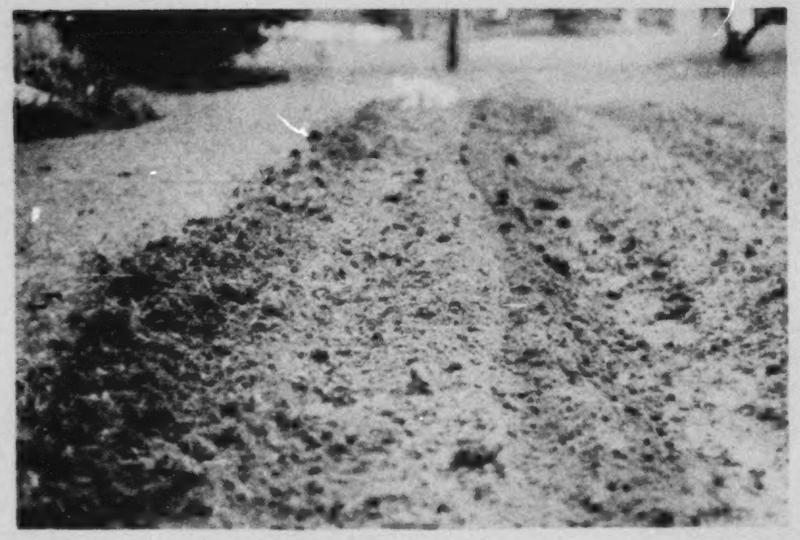

Figure 8-2

The seedbed has been "opened" with a hoe and is ready for the seed.

Figure 8-3

The seed have been dropped or placed in the furrow and await covering.

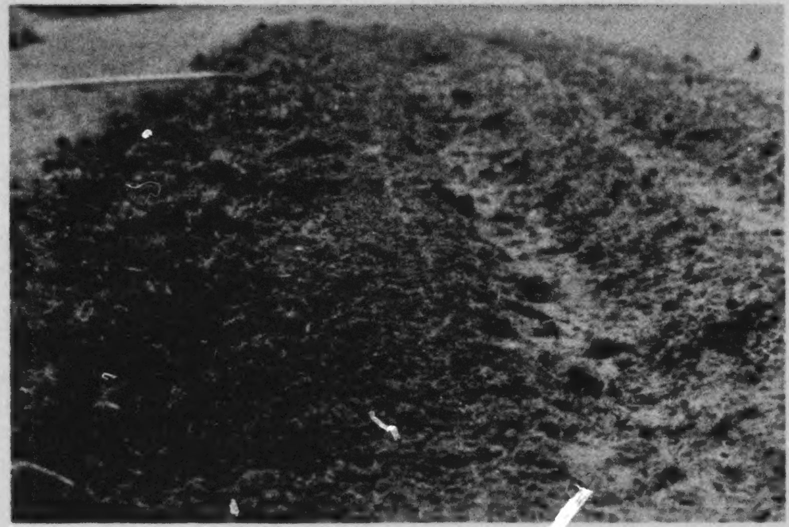

Figure 8-4

The soil has been lightly "firmed" over the seed, giving good contact between the seed and the soil.

5. What are the methods of opening the seedbed and insuring the proper depth of planting?

As mentioned above, most of the hand planters are designed to open the seedbed to the proper depth, drop the seed, cover them and firm the soil. [illegible]ting by hand, the row may be opened with a hoe or with a specially designed tool for that purpose. The depth of the furrow should be measured several times and special effort exerted to maintain a uniform depth. The seed should be spaced properly in the furrow, covered with soil, and the soil firmed slightly on top of the seed. The depth of planting is not how deep the furrow is, but rather how deep the soil is on top of the seed. (See Figures 8-5 and 8-6.)

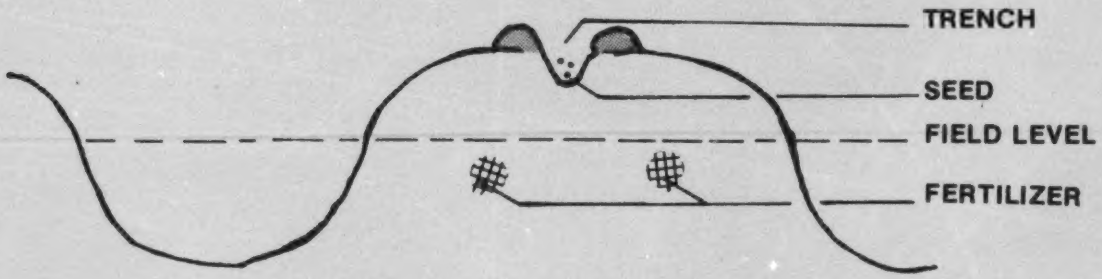

Figure 8-5.

The seedbed opened for planting and showing seed and fertilizer placement.

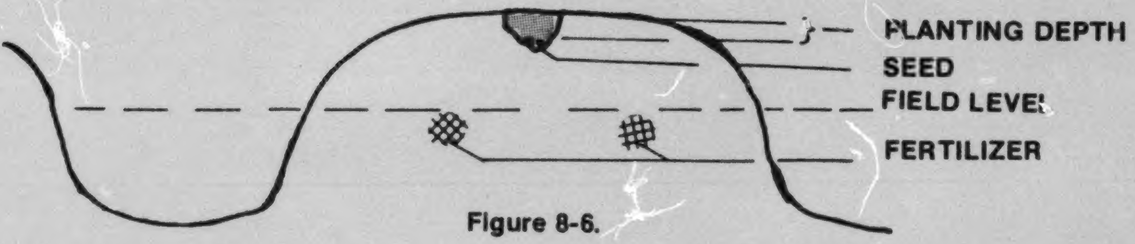

Figure 8-6.

The seedbed showing seed covered, depth of planting and fertilizer placement.

6. When should the garden be planted?

In determining the proper time for planting the garden, it is necessary that you have some knowledge of the temperature requirements of the crops you plan to grow. Vegetables are normally classified as hardy and tender. Hardy is used to indicate those vegetables which are not killed by frost or light freeze. Tender indicates vegetables that are damaged by temperatures below 32-33° F. Several vegetables will tolerate relatively low temperatues, provided the transition to the temperature is gradual; that is, extended over a period of several days. Vegetables, such as carrots, cabbage, beets, collards, kale, and spinach, will tolerate temperatures in the 20° F range, provided the transition is gradual. If the drop in temperature is sudden, these vegetables can be severely injured at considerably higher temperatures. English peas, potatoes, all of the leafy vegetables, radishes, turnips, and kohlarbi will tolerate temperatures slightly above freezing for short periods of time. All of the so-called summer vegetables—all of the beans, Southern peas, cucumbers, squash, pumpkins, watermelons, canteloupes, okra, tomatoes, and peppers— are frost-tender and can be injured by temperatures slightly above the freezing point.

Figures 8-7 and 8-8 show the last killing frost in the spring and the first killing frost in the fall for areas in Mississippi. In general, the very hardy crops, that is, those that will withstand the lower temperatures, may be planted about 4 weeks prior to the last killing frost in the spring. Those that will tolerate temperatures near freezing should not be planted more than 1 week prior to the last killing frost. The last group, or the tender vegetables, should not be planted until after all danger of frost is past. In general, planting a week or more earlier than the recommended date will not result in appreciable earliness comparable to crops planted at the recommended date. Usually, the soil temperatures are lower and also air temperatures are lower, seed germination is slower and crop growth is slower. For example, sweet corn planted March 1 at Laurel would probably mature about 5 days earlier than sweet corn planted March 20 at Laurel, provided the same varieties were used.

The same general considerations outlined above should also be considered when transplanting into the garden, unless the gardener plans to provide some protective covering to plants such as tomatoes, for example. It is of very little advantage to plant them in the garden earlier than the recommended planting date.

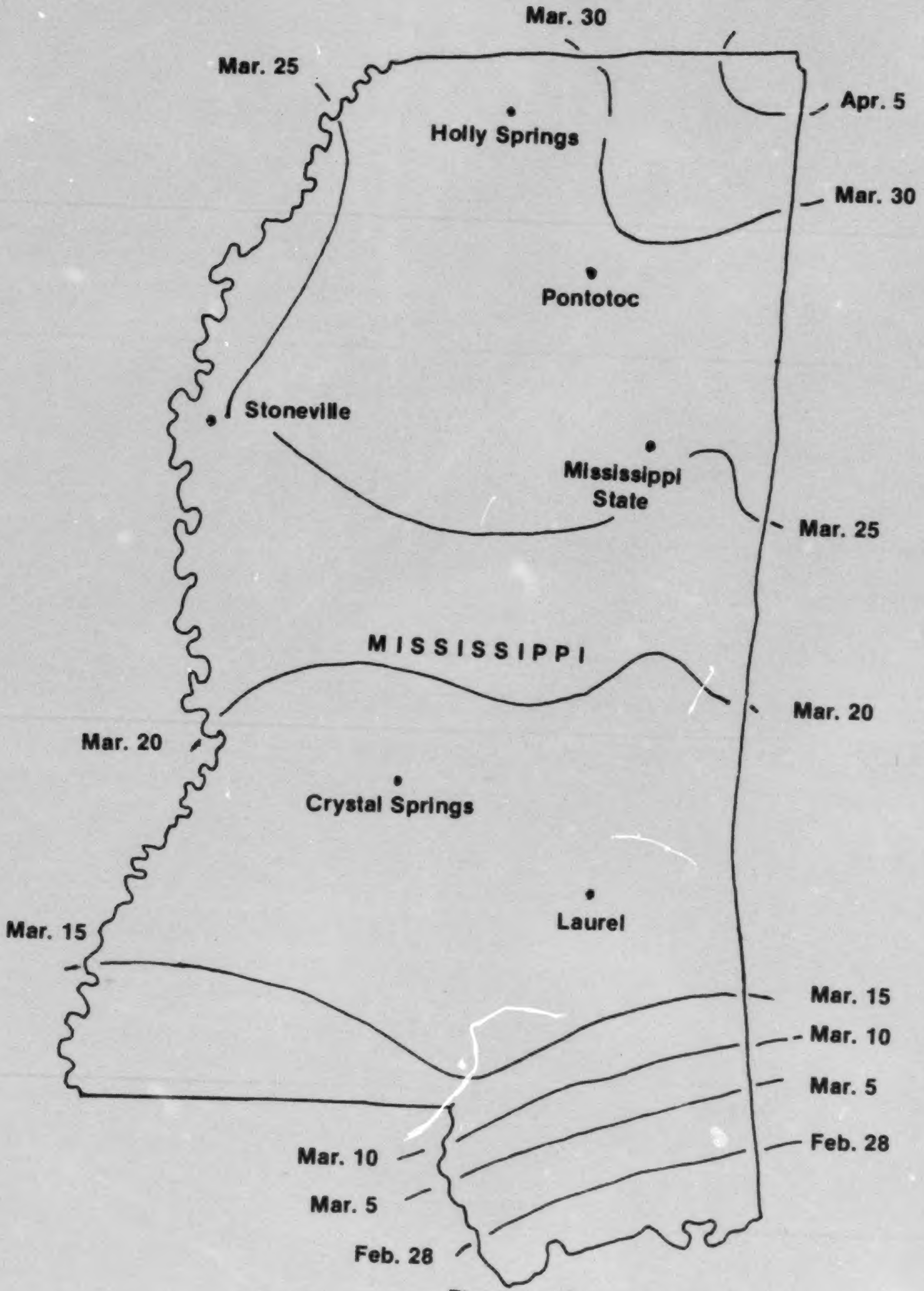
Mar. 30
Mar. 25
Apr. 5
Holly Springs
Mar. 30
Pontotoc
Stoneville
Mississippi State
Mar. 25
MISSISSIPPI
Mar. 20
Mar. 20
Crystal Springs
Laurel
Mar. 15
Mar. 15
Mar. 10
Mar. 5
Feb. 28
Mar. 10
Mar. 5
Feb. 28

Figure 8-7
Average date of last killing frost in spring

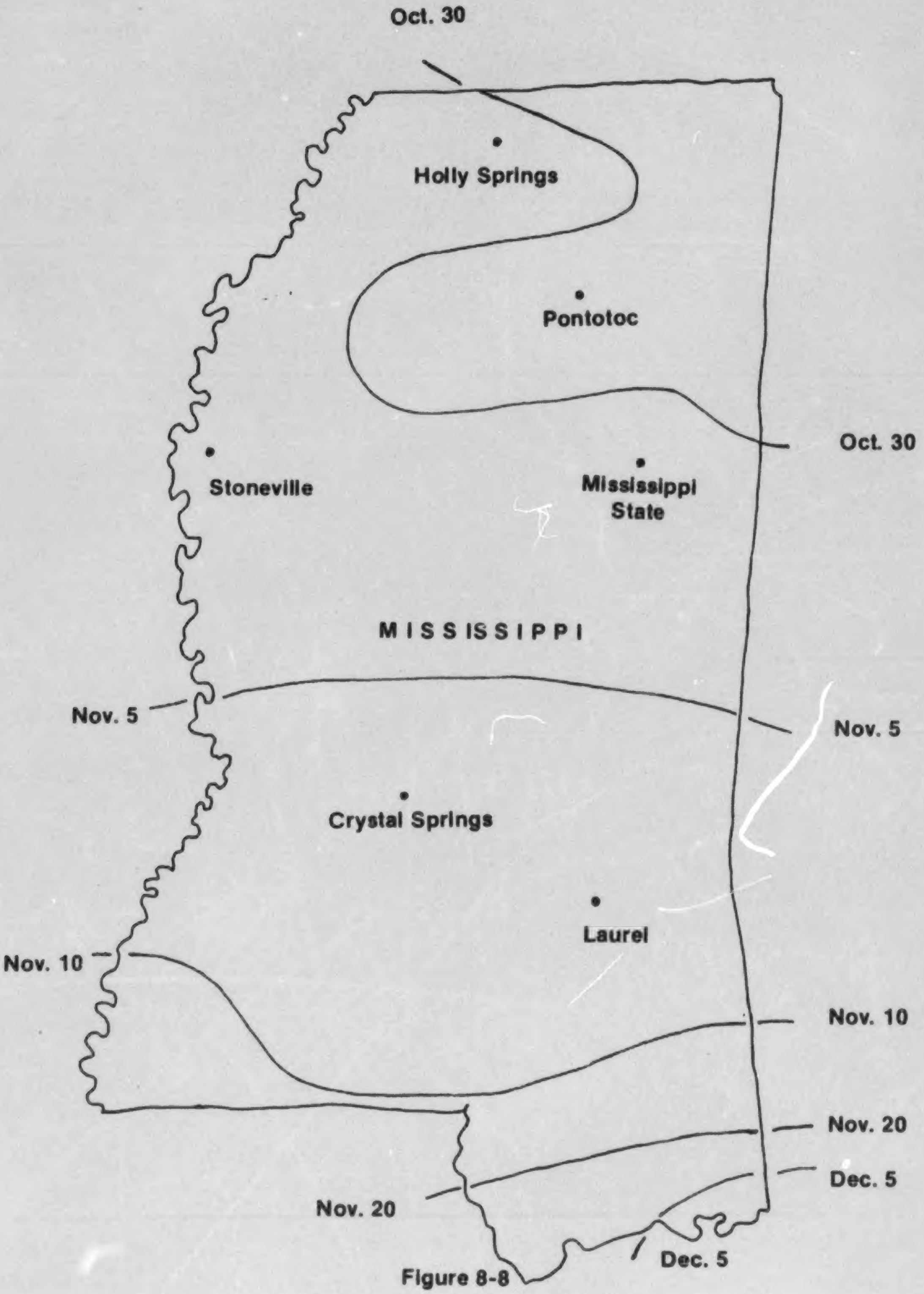
Oct. 30
Holly Springs
Pontotoc
Oct. 30
Stoneville
Mississippi State
MISSISSIPPI
Nov. 5
Nov. 5
Crystal Springs
Laurel
Nov. 10
Nov. 10
Nov. 20
Dec. 5
Nov. 20
Dec. 5

Figure 8-8
Average date of first killing frost in fall.

CHAPTER 9

CARE OF THE GARDEN

The care which the garden receives is extremely important in determining the productivity of the plants and the success of the gardener. A small garden that is well cared for will produce more than a large garden that is poorly cared for. Not only will it produce more, but the vegetables produced will be of a higher quality. It makes little sense to go to the expense of developing and planting a garden area if it is not going to be properly cared for.

Correct answers to the following questions should enable you to properly care for your garden:

1. What are the methods of weed control?
2. What are the methods of insect control?
3. What are the methods of disease control?
4. When and how should plants be thinned and pruned?
5. What are the methods of staking and supporting the plants?
6. How can soil moisture be controlled?
7. When is side-dressing profitable?
8. How can birds and other animal pests be controlled?
9. When and how should cultivation be accomplished?
10. What materials can be used for mulching and how should they be applied?
11. How can plant residue be removed following the harvest of the crop?

1. What are the methods of weed control?

Methods commonly used to control weeds in home gardens included :

A. Cultivation.

B. Hoeing.

C. Use of mulches.

D. Chemical weed-control measures.

Weeds compete with the crop plants for nutrients, water, and sunlight. In addition, they complicate the control of diseases and pests, such as insects. Cultivation, properly utilized, is one of the most efficient and least expensive methods of controlling weeds in the garden. Occasionally, there will be weed plants in the row too close to the crop plants to be destroyed effectively by cultivation. It may be necessary to remove some of these with a hoe. The smaller the weed and grass plants are at the time of cultivation and/or hoeing, the easier they are to control. Hoeing and cultivation should be done only as needed to control the weeds and should be shallow to prevent damage to the crop-plants' root systems.

Another method of controlling weeds mentioned above is the use of mulches. A mulch is a layer of some material that is maintained around the crop plant to control weeds and conserve moisture. Mulches, properly applied and maintained, are quite effective as weed-control measures.

The use of chemical weed-control agents is another method of controlling weeds in the vegetable garden. It must be remembered that vegetable plants and weed and grass plants are quite similar in many respects. A chemical that may control the growth of one plant may also control the growth of the other, or it may have no effect on the other plant. Many of the chemicals that are used to control weed plants are growth-regulator type chemicals. These materials may be toxic to a given plant, but when used in slightly lower quantities, may promote growth of other plants. In addition, many of these chemicals will leave residues either on the crop itself that might be consumed, or in the soil that might carry over to future crops. For these reasons, extreme caution must be utilized in the use of chemical weed-control agents. Always follow the directions given on the label for the product. Never use the product on a plant for which the product is not labeled. More detailed chemical weed-control information is given in Appendix B.

2. What are the methods of insect control?

There are 3 principle methods of controlling insects in the home garden. These methods are:

A. Use of resistant varieties.

B. Use of biological controls.

C. Use of chemical controls.

In order for any control measure to be effective, it must be applied at the proper time and in the proper manner. There are few vegetable varieties that are resistant to insects. However, when a resistant variety is available it should be used. There are varieties of several vegetable crops that are resistant to nematodes, for example. If you know you have a nematode problem in your garden, you would be wise to use one of the resistant varieties.

Biological control of insects has been practiced in some areas for many years. For example, it is a well known fact that ladybugs and praying mantids are excellent foragers on aphids and similar insects. Many birds, such as robins, bluebirds, wrens, etc., often consume their weight in insects every 24 hours. Another biological-control measure that has come into its own in recent years has been the use of bacterial and viral agents that are destructive to the insects. These agents are usually specific for the insect pest toward which they are directed and are harmless to other insects and to warm-blooded animals as well.

The other major method of controlling insects in the home garden is the use of chemical insecticides. In order for chemical controls to be effective, it must be the proper chemical applied at the proper time and in the appropriate manner. In addition, coverage must be thorough and generally the best results are obtained when the chemical is applied in late evenings so there is longer exposure of the insect pest to the chemical with minimal exposure to high light intensities. More specific chemical-control measures for insects are given in Appendix C.

3. What are the methods of disease control?

Three principle methods are used in the control of plant diseases in the home vegetable garden. These methods include:

A. The use of resistant varieties.

B. The use of disease-free seed.

C. The chemical treatment of seeds, plants, and/or soil.

A number of vegetable varieties are resistant to one or more of the common diseases that attack the crop. If you are in an area where diseases may be prevelant, you would do well to consider the use of these resistant varieties. The use of a variety that is resistant to the disease is the least expensive method of controlling the disease and is also the one that generally produces the best results.

Another method of controlling diseases is the use of disease-free seed. Many of the viral and bacterial diseases that attack vegetable crops are seed-borne diseases. One of the best ways to combat these is to get seed that were produced in the relatively disease-free areas of the west, that is, California, Washington, Oregon, or Idaho. Environmental conditions in these areas are not conducive to disease development, and they are able to produce disease-free seed. These bacterial and viral diseases are also spread from one plant to another by insects, so the control of the insect carriers would also help in disease control.

The other method of controlling diseases in vegetable crops is the use of chemical treatment of seeds, plants, and/or soil. Again, thorough coverage using the proper material at the proper time is essential to good disease control. There is not one particular chemical that is effective in the control of all diseases of all vegetable crops. As with all other chemicals, it is imperative that label directions be followed in the use of chemical disease-control measure. Always read and follow label instructions carefully. More specific chemical disease-control measures are given in Appendix D.

4. When and how should plants be thinned and pruned?

In the typical garden, crops that are directly seeded in the garden are normally planted thick and then thinned to the desired stand. This is to insure that an adequate number of plants will be obtained to give the desired stand. When this is practiced, the plants should be thinned immediately after the first cultivation. Normally, this should occur at about the time the first or second true leaf begins to expand. Thinning should be after the first cultivation because frequently in cultivating, one or more plants may be destroyed. At the time the plants are thinned, those that appear to be stunted, diseased, or off-color should be removed. The healthiest and strongest appearing plants should be selected to leave in the row. The plants that are to be removed are normally cut out with a hoe or pulled from the row by hand. The plants should be thinned early because of competition among the plants for nutrients and sunlight, as well as water.

The tomato is the plant most frequently pruned in the home garden. (See Figure 9-1.) It is normally recommended that tomatoes be staked and trained to a 2 stem system. Pruning the tomato involves the removal of the lateral branches. In the 2-stem system, the lateral branch appearing immediately beneath the first flower cluster is selected and used as the second stem, with the main plant stem being the first. All other laterals should be removed as they appear.

Figure 9-1

Tomato plant pruned to 2 stems and tied to the stake just beneath the lateral branch. The plant is ready for the second tie which shoud be 10 to 12 inches higher.

5. What are the methods of staking and supporting plants?

Generally, the method of support varies depending on the crop plant to be supported. Supports may range from a simple stake or pole, around which the plant may twine or to which it may be tied, to a complicated trellis system to which the plants may be trained. Plants may be trained to a support of some type for any of several reasons, such as conservation of space, ease of harvest, or to make it easier to control insect and disease problems.

Plants which are normally provided with support in the home garden are the English peas, the pole-type beans, both lima and snap, and tomatoes. Cucumbers, egg plants, and peppers are sometimes provided with supports, but not normally.

Probably the most common type of support is the simple stake or pole, which is driven down beside the plant and, in the case of tomatoes, the plant is tied to the pole or stake, the first tie just beneath the first fruit cluster and then at regular intervals as the plant develops. The pole-type beans twine about the pole or stake as they grow. They may occasionally need some help in getting started, but once started they will proceed without additional attention. This type of support is illustrated in Figure 9-2.

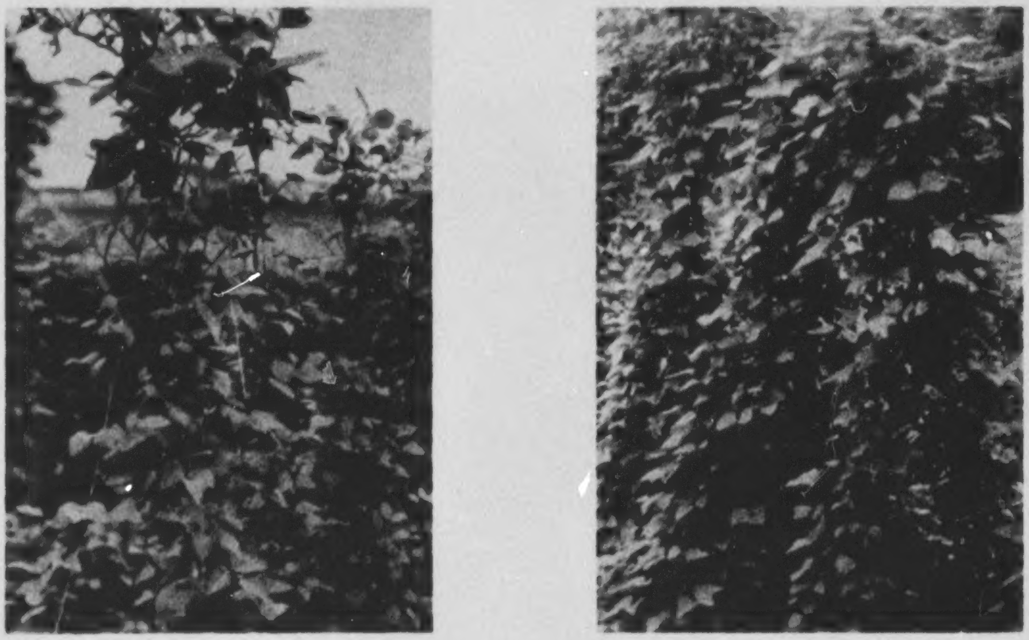

Figure 9-2

Methods of "staking" beans. Note poles on opposite rows—crossed near the top and tied (right). Shown on the left is twine from wire over the row to the base of the plant. The rows in the photo on the right are lima beans, while the left photo shows snap beans.

Another common type of staking or supporting plants is a type of trellis which may be nothing more than a woven wire stretched between posts or it may be 2 wires, one at the top and one at the bottom of 2 posts with twine wrapped around the wires. This type of support is illustrated in Figure 9-2. It is more commonly used for beans and peas.

Another type of support that has occasionally been used with tomatoes in recent years is a cage which is simply a cylinder made from something similar to reinforcing wire formed into a cylinder approximately 15 to 18 inches in diameter and placed down around the plant.

In the past, some gardeners have interplanted beans in corn and used the corn stalks as supports for the beans. This is not a recommended procedure, however, it does work.

The poles or stakes that are used may be of either wood or metal, wood being the most common. The wooden stakes may range from 1" x 1", 2" x 2", or 3"-4" treated fence posts, 4 to 6 feet in length, depending on the type crop to be supported. Regardless of the type of supporting material used, it should be adequate to support the plants and it should be placed in position in time to provide the best results in supporting the plants. Some attention should be given to training the plants to the supports.

6. How can soil moisture be controlled?

There are two types of soil-moisture control; drainage and the application of supplemental water through irrigation.

During periods of heavy rain, it is often necessary to provide drainage for the garden area. The garden should be located and rows formed so that water does not stand in the garden area for more than a very short period of time. Very few vegetable crops will tolerate "wet feet." If the garden is in a low area, it may be necessary to construct drainage ditches around the area to facilitate removal of excess water. The use of high beds or rows will also help the plants up out of the water area.

It is a rare season in which vegetable crops would not occasionaly benefit from supplemental moisture. Supplemental moisture or irrigation water can be beneficial in most seasons in the South, especially in Mississippi. Any time the soil becomes dry enough the plants begin to wilt rather extensively, the plants' yield and the quality of their production will be damaged. Supplemental water is normally applied to the home garden in 1 of 2 manners; furrow irrigation or sprinkler irrigation, such as the use of the common lawn sprinkler. Either method will get the job done. However, if the garden is so located and constructed that furrow irrigation can be used, this is the preferred method. The garden would need to be relatively level or, if it is on a slope, the rows should be run with the contour. The water could then be drained from a hose or from the source into the furrow and fill the furrow and soak into the soil, providing soil moisture.

If the garden is on a slope and the rows are not on the contour, then the only option would be to apply water by the sprinkler or not to apply water at all. A big disadvantage of the sprinkler method is that the foliage is wet and pesticides that may have been applied may be washed from the foliage. Moisture on the foliage also creates an environment favorable for disease development. The time at which water may be applied by sprinkler is somewhat restricted. The garden should not be irrigated by the sprinkler method from roughly midmorning until late afternon during the late spring and summer months, particularly if it is sunny. When the foliage is wet, waterdrops cling to the plants' foliage and magnify the sun's rays, and this will scald vegetable plants. Generally, irrigation is best accomplished in the late afternoon and evening hours.

7. When is side-dressing profitable?

Side-dressing, or the addition of supplemental fertilizers after the plants have become established, especially nitrogenous fertilizer, is practiced normally with vegetable crops that are on the site for a relatively long period-more than 2 months. It is especially beneficial when the crop is one that has a very shallow, restricted root system, such as some of the leafy greens.

Side-dressing is profitable anytime the crop is produced for its foliage, such as spinach or cabbage, or for its succulent stem or flower, such as broccoli or cauliflower, or when the crop remains in the garden for an extended period, such as tomato and pepper crops. Most non-leguminous crops are side-dressed at one time or another. Occasionally, particularly during the spring when the soil may be cold, leguminous crops will benefit from a side-dress application of nitrogen. The supplemental nitrogen should be carefully applied and should be placed 4 to 6 inches to one side (the up-hill side in a sloping area) of the plants and covered lightly. Plant foliage should be dry when the nitrogen is applied. If the foliage is moist and particles of the nitrogen fertilizer happen to touch the foliage, it will stick and burn the foliage of the plant. As a general rule, a side-dress application of nitrogen should not exceed 30 pounds of actual nitrogen per acre (3 lbs. ammonia nitrate per 1,000 sq. ft). If more than this is required by the crop, it should be applied as a split application, that is, with an interval of some 3 to 4 weeks between applications.

8. How can birds and other animal pests be controlled?

There is no highly effective method for controlling these pests. Locating the garden area as far as possible from protective covering for the pests is probably the most effective means of controlling them. Trees, shrubbery, and weedy areas adjacent to the garden provide excellent cover for these pests and the garden is a ready source of food for them.

Trapping the pests in a cage-type trap where their cries can frighten away other pests can be an effective control measure.

Do not discard diseased or damaged fruit in or near the garden area. This would simply serve as an advertisement that food is available there. In some cases, it may be necessary to harvest fruits before they reach full maturity. The pests apparently perceive color changes in the fruits as well as man does and associate them with ripeness. A tomato, for example, could be harvested just as soon as it begins to turn pink and it will continue development under proper conditions in the home. Generally, scarecrows are of little, if any, benefit. Artificial noisemakers in the area of the garden may be effective in some instances.

9. When and how should cultivation be accomplished?

Cultivation or tilling of the soil is a valuable means of weed control and also aids in the penetration of oxygen and water. Roots of the plants must have oxygen in order for respiration and growth to proceed at normal rates. This oxygen is taken from the tiny air spaces in the soil. Excessive cultivation should be avoided, however, because it tends to damage the plants' root system and increase the loss of soil moisture into the atmosphere.

Tools or equipment for cultivation are quite varied, ranging from the hoe or rake to the push-type garden plow, the roto-tiller and the tractor-drawn cultivators. Regardless of how it is accomplished, cultivation should be shallow and should be performed only as is needed to control weeds and grasses and/or to break soil crusts. Cultivation under other conditions than these causes more damage than benefit. Most of the crop plant's root system is located in the top 3 to 4 inches of soil. Roots may extend, in many cases, as much as 2 to 4 feet from the base of the plant. For these reasons, it is obvious that deep cultivation will severely damage the plants' root system.

10. What materials can be used for mulching and when should they be applied?

A mulch is any material that is spread over the soil surface to protect the plant's root system from temperature extremes or from excessive loss of moisture.

Materials that are used for mulching vary from straw and lawn clippings and sawdust and wood shavings, to paper and plastic films. The proper type of mulch can result in higher soil temperatures in the winter months and lower soil temperatures during the summer months. Mulches also provide excellent control of weed and grass plants and greatly help in moisture conservation.

The major disadvantages of mulches are the increased cost of controlling insect pests and the removal of the mulch material after the growing season. Most mulches can provide hiding places for insects and make it more difficult to control them in the garden area. Some of the materials that are used for mulches, plastic films for example, must be removed from the garden area following the cropping season so that the area can be properly prepared for the next crop. Others, such as straw, sawdust, etc., are simply incorporated into the soil as it is broken for the next crop and may be quite beneficial for their effect on the soil texture.

Mulches are generally more beneficial on crops that remain on the ground a relatively long period. When to apply the mulch is normally determined by the type of material used. If the mulch is a film or sheet, such as plastic film or the commercially-marketed paper mulches that are applied as a large sheet, it is normally applied prior to planting or transplanting the crop. The crop then is planted or transplanted through holes in the mulch material. If the mulch is a material such as straw, sawdust, grass clippings, etc., it is normally applied after the plants have become established. Commercially available plastic and paper-mulching materials are normally applied as a single layer over the row. Material, such as grass and straw, is applied in layers around the plant or up to 2 or 3 inches in thickness. Usually, the thicker the mulch layer, the better the weed control.

11. How can plant residue be removed following harvesting of the crop?

Once the crop has been harvested, the plant residue should be removed in preparation for subsequent crops. Some gardeners prefer to cut the old plants at the soil line, remove them from the garden, dry them and burn them as a means of controlling disease organisms in subsequent crops. This is probably the better method of disposal if the area is to be replanted immediately.

Another method practiced by many gardeners of disposing of the residue is to incorporate it into the soil. This can be done if it is going to be 2 or 3 weeks before the area is to be planted again. The plants could be shredded with something similar to a rotary lawn mower and then the shredded material incorporated into the soil with a roto-tiller or a breaking plow. If soil moisture conditions are satisfactory for plant growth, this material will begin to decompose and will return nutrients and humus to the soil. Generally, this would be the preferred method of disposing of crop residues because of the beneficial effects to the garden area. If the area is to be replanted immediately, however, the refuse should not be incorporated into the garden, but should be removed from the area. Green plant material incorporated into the soil will undergo a heating period as it begins to decompose and the soil in the area may reach temperatures as high as 130° F. Seed planted under these type conditions would be severely damaged, if not destroyed.

CHAPTER 10

HARVESTING AND PROCESSING

In many instances, the garden will provide more produce than that needed for fresh use. The value of the garden will be enhanced if the student has an understanding of several methods of food processing, so that the surplus produce can be preserved for later use.

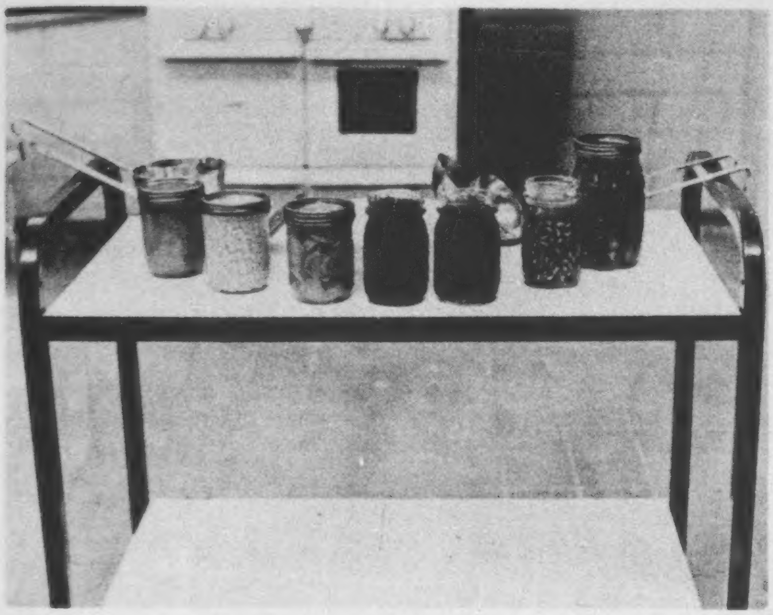

Figure 10-1

The home garden pays off!

Although some products can be preserved by fermentation, pickling, jelly making and dehydration, the usual methods of choice will be canning or freezing. Refrigeration will be used whether the produce is to be utilized fresh or processed. Before selecting a processing method and proceeding to use it, the gardener should carefully consider the following questions:

1. When should vegetables be harvested?
2. What techniques should be used for harvesting vegetables?
3. What volume of each vegetable should be harvested?
4. How should vegetables be handled and graded prior to processing?

5. What methods of processing are more suitable for the home gardener?

6. What are the factors involved in storage of processed vegetables in the home?

1. When Should Vegetables Be Harvested?

As the vegetables approach maturity, they should be examined daily, as the quality changes are very rapid in the final stages of maturing. It is well to remember that the quality of most vegetables is not improved by processing and we do well to maintain the quality inherent in the product at the time of harvest.

The vegetables should be harvested and used or processed as quickly as possible after they attain maturity. For some details concerning the time to harvest specific vegetables, refer to Appendix A. The material presented in Appendix A was prepared by Dr. Milo Burnham, Cooperative Extension Service, Mississippi State University and Dr. Jesse Harness, Alcorn State University.

2. What Technique Should Be Used In Harvesting Vegetables?

Harvesting vegetables depends somewhat on how they will be used and to a great extent upon the individual crop. Care must be taken that the plant is not damaged and that immature produce is not exposed to direct sunlight which will result in sunburn. Individual units should be removed from the plant by applying pressure at the stem end and snapping them off. Avoid simply picking up the vegetable and pulling, as this will disturb the plant and in some cases the plant may be pulled from the soil.

It is advisable to wear a long-sleeve shirt and gloves when harvesting such crops as okra, cucumbers, melons, squash and sweet corn. These are the crops which result in almost universal discomfort if harvested without protective clothing , but due to allergies and individual sensitivity, use of such clothing may be advisable regardless of the particular crop.

As produce is harvested, it is advisable to remove and discard all decaying, overripe, or damaged produce. This practice will help control diseases and insects, will make subsequent harvesting easier and, in some cases, will stimulate setting-on of more produce.

3. What Volume Of Each Vegetable Should Be Harvested?

Sooner or later the garden will produce at a pace beyond what is needed for fresh or daily table ues. Small amounts of produce can be held at room temparature, especially if the produce is harvested when slightly immature, and large amounts can be held refrigerated for fresh use. Before the garden is producing at this rate, plans should have been completed for processing the produce. All mature produce should be harvested at each picking and used fresh, refrigerated for future use, sold, or processed.

The quantity of produce which can be processed in a day depends to a large extent on the product. Pressure processing requires substantial time and will very often be the limiting factor in canning. Preparation by snipping off the ends and breaking them into pieces, in the case of snap beans, will regulate the amount that can be handled in a day.

Only the amount which can be processed in 10 to 12 hours should be retained for this purpose and the rest should be used fresh or sold. Snap beans, peas, lima beans and Southern peas, which are overmature for use or processing, may be left for harvest as dry products.

4. How Should Vegetables Be Handled And Graded Prior To Processing?

There is no substitute for rapid handling of garden produce if high quality is to be maintained. Remember that produce is not improved by processing, so we must constantly strive to harvest at the peak of quality and maintain that level of goodness throughout handling and processing.

Commercial processors usually have items such as peas, corn, lima beans, leafy greens, etc. in the can and processed or in the freezer 6 hours from the time they are harvested. The gardener should strive to at least equal this goal.

Processing of vegetables requires expensive jars, packages, storage space and a lot of hot, hard work; therefore, only top quality produce should be processed. After harvest, the product should be sorted into lots suitable for the intended use. For example, tomatoes to be canned whole should be firm, ripe and unblemished, while those to be used for juice or catsup can be slightly overripe, soft and blemished so long as all decayed, damaged and blemished protions are removed prior to use.

If some of the beans have matured beyond the ideal stage for green beans, the beans may be removed from the mature pods and added to the green beans as shelled beans or used as dried beans.

The smaller, more tender orka pods should be used for pickling and the larger ones for sliced, frozen or canned okra.

All produce should be harvested and placed in the shade or preferably in the refrigerator until processed. In many of the garden vegetables, sugar is converted to starch with a resulting loss of quality when the vegetables are held unrefrigerated. This process is slowed, and in some cases reversed, by holding the product at refrigerator temperatures. However, some specific crops, such as sweet potatoes, are severely damaged when subjected to temperatures of 50° F or less. Irish potatoes held at refrigerator temperatures will make French fries and chips which will be dark in color due to excessive sugar. However, most other products should be refrigerated until processed.

5. What Methods Of Processing Are Best For Processing Garden Vegetables?

The choosing of a processing method will depend upon the facilities and equipment available to the gardener. Freezing is perhaps the easiest to do, but frozen produce must be stored at 0° F or below to maintain quality. Canned produce may be held at room temperature and will retain good quality from one harvest season to the next. Some products are not readily frozen due to difficulty in inactivating enzymes. Ear corn is a good example of a product difficult to blanch adequately due to the problem of getting sufficient heat to the center of the cob.

We will explore the principles of both canning and freezing, as these will usually be the chosen preservation methods.

A. The basic steps in home canning vegetables are as follows:

1. Wash the product thoroughly. Soil contains some of the most heat-resistant bacteria known. Small lots of vegetables should be washed under running water in such a way that the washed-off soil does not touch the food product again. Handle the vegetable gently and complete washing quickly, as excessive soaking will result in quality loss.

2. Trim away all decayed, discolored, insect damaged or otherwise unuseable materials. Decayed and damaged areas harbor microorganisms which may cause spoilage if not removed.

3. Reduce the size of the produce if necessary. At this step in the procedure, the green beans are snapped or cut into the desired size, okra is sliced, beets diced, corn cut from the cob, etc.

4. Blanch the product. Blanching may be accomplished by heating water to boiling point in a large container. Add the vegetables to the hot water and bring the water to a good rolling boil once again. For most products, blanching will be adequate after 1 minute in the boiling water, but snap beans require 5 minutes to insure an adequate blanch. After blanching, the product should be filled into the containers as quickly as possible. The blanching step accomplishes several very important functions as follows:

   a. It is a further washing operation which removes soil and spoilage microorganisms.

   b. Leafy greens and similar products are wilted and this facilitates filling an adequate amount of product into the containers.

   c. Air is less soluble in hot liquid than it is in cold, so it is driven out of the product. If air is not driven out, it will result in oxidative changes which are harmful to flavor, color, etc.

d. Blanching inactivates enzymes which cause changes in color, flavor, and viscosity if left in an active state. Enzymatic reactions are very fast; a good deal of damage can be done between the time the product is harvested and processed, unless rapid handling and adequate blanching is carried out. Blanching tends to fix the color of green vegetables so that it losses due to canning are less severe.

5. Filling the product into the containers. The jars or tin cans and lids should be thoroughly washed with a warm detergent solution and rinsed carefully. The containers should be filled to within 90 percent of the over-flow capacity. When a brine or syrup is required, it should be heated to about 200° F before being added to the container. Heating the solution will aid in dissolving the sugar or salt and will drive air out of the solution. Remember that gasses are more soluble in cold solutions. Removal of air from the packing media will cut down oxidative changes in the stored product. Be sure the brine or syrup covers the product completely, as this will prevent darkening of the product at the top of the container.

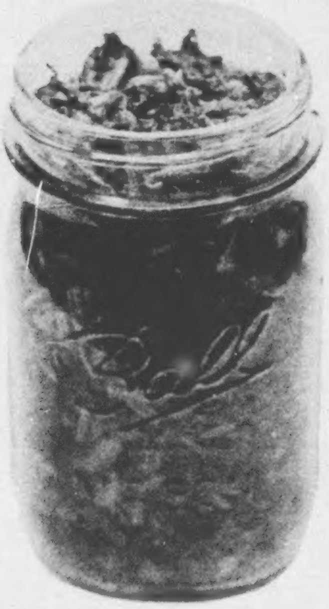

Figure 10-2

A container substantially filled with greens.

Glass jars have two different types of closures; one involves a metal screw-on band with a flat metal lid with sealing compound and the other is a lined zinc screw cap with a rubber sealing ring.

When the metal screw-on type with the flat metal lid is used, fill the jar and place the lid on the jar with the sealing compound next to the jar top. Screw the metal band down snug and place the jars in the processing retort. Gasses will escape from the jars as the food heats. The two-piece screw-on top should not be tightened after processing has been completed as this type container depends upon internal vacuum to complete the seal.

When the zinc lid is used, fit the rubber ring around the jar on the sealing shoulder. Wipe the rubber ring and jar rim carefully. Screw the zinc cap on firmly and back it off about one-quarter of an inch. When the process has been completed, this type cap should be tightened firmly.

6. Processing. This is the most important part of any canning operation. Even though everything else has been done perfectly, faulty processing will result in spoilage of the food. Under-processing of the low-acid products such as beans, peas, corn, greens, etc. can also result in spoilage by bacteria which produce deadly poisons. (See Figures 10-3 through 10-10.)

Figure 10-3

Snap or green beans

Figure 10-4

English Peas, often called sweet peas

Low Acid Foods

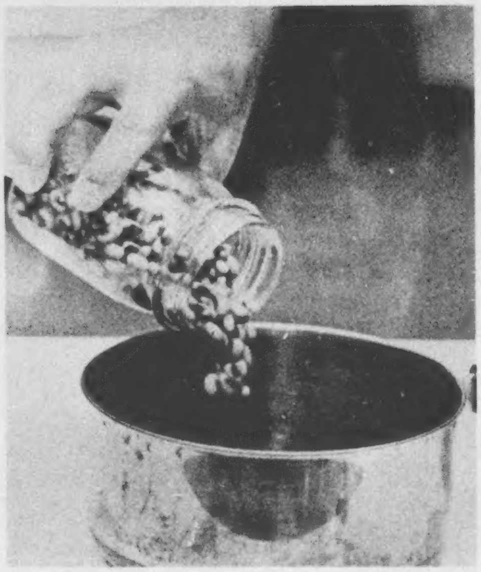

Figure 10-5

Black-eye Pea, sometimes called protepea.

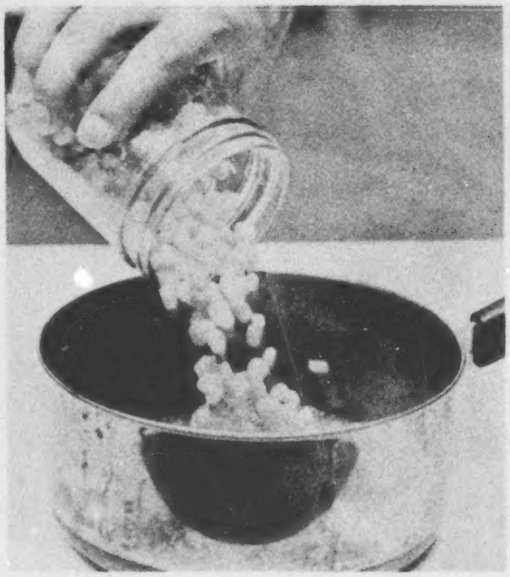

Figure 10-6

Sweet Corn—a universal favorite

Figure 10-7

Greens from the garden

Figure 10-8

Whole carrots

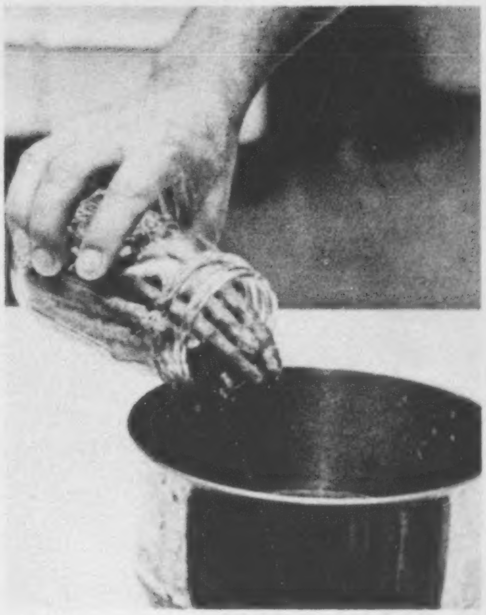

Figure 10-9

Asparagus spears

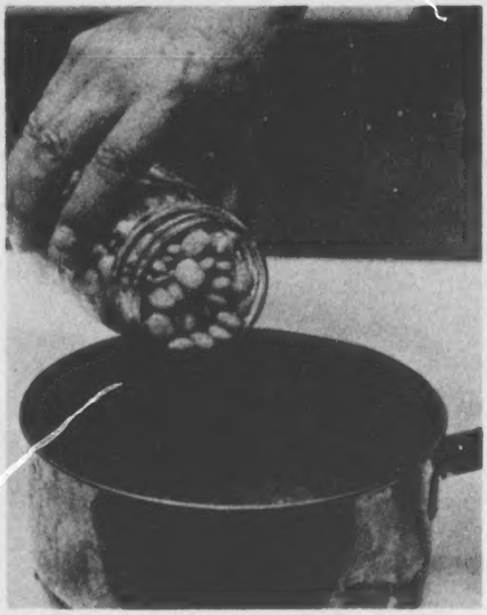

Figure 10-10

Lima beans

Any product with a hydrogen ion concentration (pH) above 4.5 **must be given a pressure process which will inactivate spores of Clostridium botulinum,** one of the toxigenic microorganisms. Acid products such as peaches, apples, sauerkraut and some varieties of tomatoes may be safely processed in boiling water. (See Figures 10-10 & 10-11.)

For specific recommendations concering processing times and temperatures refer to Table 10-1 for low acid foods:

All of the products listed in Table 10-1 must be processed in a pressure cooker which can be maintained at 10 pounds per square inch of steam pressure, which corresponds with 240° F. No other pressure and temperature may be used for any reason unless other safe processes are obtained from qualified food technologists or home economists.

Table 10-2 indicates the processes that will be satisfactory for the acid products with pH values below 4.5.

High Acid Foods

Figure 10-11

Peach-halves for desert

Figure 10-12

Tomatoes for your vitamin-C

Table 10-1

Food	Time in Minutes at 240° F (10 pounds per square-inch steam pressure)	
	Pints	**Quarts**
Asparagus	30	35
Beans (string or wax)	20	25
Beans (lima	40	50
Beets	30	40
Broccoli	25	40
Brussel Sprouts	45	55
Cabbage	45	55
Carrots	25	30
Cauliflower	25	40
Corn (cream style)	95	Package in pint size only
Corn (whole grain)	55	85
Eggplant	30	40
Hominy	60	70
Mushrooms	30	35
Okra	25	40
Onions	25	40
Parsnips or Turnips	20	25
Peas (all kinds)	40	45
Peppers (bell)	35	35
Peppers (pimiento)	10	—
Potatoes (Irish)	40	40
Potatoes (sweet) dry pack	65	95
Potatoes (sweet) wet pack	55	90
Pumpkin	60	80
Rutabagas	35	35
Soybeans	80	80
Spinach	70	90
Squash (scalloped, summer, or zucchini)	25	30
Squash (acorn, crookneck, or hubbard)	60	80
Tomatoes (Some low acid varieties)	10	10

For information concerning other vegetables, contact the county extension home economist.

Table 10-2

Food Product	Time in Minutes in Boiling Water (212° F)	
	Pints	Quarts
Tomatoes (pH 4.5 or less)	35	45
Tomato juice (pH 4.5 or less)	10	10
Stewed tomatoes (pH 4.5 or less)	55	55
Strawberries	15	15
Rhubarb	10	10
Plums	20	20
Peaches	25	30
Grapes	20	20
Figs	30	30
Dried fruits	15	15
Berries	15	20
Applesauce	25	25
Apples	20	25
Pickles (pH 4.5 or less)		
Bread & butter	5	10
Chutney	5	5
Cross-cut slices	5	—
Sweet gherkins	5	—
Piccalilli	5	—
Corn relish	15	—
Green tomato pickles	15	—
Pickled pears (air cool)	20	—
Watermelon pickles (air cool)	5	—
Pickled crab apples	20	—
Fig pickles	10	—
Dill pickles-fresh style	5	—
Preserves	10	—
Jams	10	—
Fruit butters	10	—
Jellies	5	—

7. Cooling. Heat-processed products should be cooled as quickly as possible after the proper process has been given. Glass jars will not generally stand more than an 80° F temperature shock without breaking; therefore, avoid putting hot jars on cold cloths or other cold surfaces. Leave a space between all jars so that air will flow around them. When the jars and contents are at about body temperature, that is, they may be placed against the upper arm or face without discomfort, they may be placed in storage.

8. Storage. Wipe off the jars and label them carefully showing the name of the product and the date it was processed. Store the jars in a dry, cool, preferably dark place, where they will not freeze. Heat will cause the product to lose quality rapidly. Remember that for each 18° F increase in temperature the rate of chemical change is doubled. Dampness will result in rusting of metal lids and may cause leakage and spoilage.

Never use a can of food that has any signs of spoilage. Bulging lids or leakage during storage may mean the product has spoiled. Always examine the product for signs of spoilage and discard any questionable product.

B. The basic steps in freezing a garden product are as follows:

1. Select good sound produce which is as free as possible from defects such as decay, insect injury, mechanical damage, green, or discolored areas.

2. Wash thoroughly to remove soil, surface mold, and pesticide residues. Do not let produce soak in water.

3. Prepare as you would for table use. That is, slice, dice, cut into chunks, or leave whole, as preferred.

4. Blanch the vegetables thoroughly as this is the step at which the quality of frozen products is often determined. Blanching involves heating sufficient water to a rolling boil so that the temperature will remain unchanged when the cool product is added. Generally, a gallon of water to each quart of product will be adequate. When the water is boiling vigorously, place the produce in a perforated screen-type container or a cheesecloth bag and immerse the product. Maintain a good rolling boil and time the blanch from the time it is immersed if the water is boiling. If the water is cooled when the product is added, start timing the blanch after a good rolling boil has been reestablished. The same water may be used to blanch other batches of the same kind of product. Fruit products do not generally require blanching. Refer to Table 10-3 for blanching times.

If steam is used in blanching, add at least 2 minutes to each of the blanching times.

5. Chill the product by immersing it in cold water, perferably ice water. When the product is cold throughout the mass, drain it until all free water has been removed.

Table 10-3

Food Product	Blanching Time in Minutes in Water at Boiling Temperature
Asparagus	2-2
Beans, lima	2-3
Beans, green or wax	3-4
Broccoli	3-4
Brussell sprouts	4
Carrots	3
Corn, whole grain	5-7
Greens, all kinds	2-3
Peas, Southern or English	1-2
Peppers	Do not blanch
Tomatoes, stewed	Cook 5-10 minutes

6. Pack the product firmly into the package. Glass jars or a good heat-sealable pouch make excellent frozen food packages. Seal the package so that air is excluded from the package and water vapor is sealed in. If water vapor escapes through the seal or the package walls, dehydration and quality loss will result. Dehydration of a frozen food is sometimes referred to as freezer burn.

In some cases, it will be useful to individually quick freeze (IQF) the diced, sliced or otherwise prepared products to obtain a free-flowing product so as to facilitate portion control at the time of preparation. If this is desirable, the individual units should be spread out on a tray so as to be separated so they will not freeze together. They may then be frozen and packaged after freezing to obtain a free-flowing product.

7. The freezing step is critical in the maintenance of good quality in frozen foods. To facilitate quick freezing, a good air-blast freezer capable of maintaining a temperature of -20° F is required. The product should be placed in the freezer so that cold air can flow around the individual packages or pieces in the case of IQF. Best results will be obtained when the temperature of the product is reduced from 32° F to below 25° F in 30 minutes or less. If your freezer will accomplish this rate of freezing, the resulting product will not be damaged by the freezing step.

When the product temperature has been reduced to 0° F, it may be restacked in the frozen-storage cabinet so as to conserve space. The temperature must be maintained at or below 0° F as long as the produce is held frozen. It is useful to place a piece of ice frozen in a characteristic shape such as a heart, circle, or some other readily recognizable shape in the storage area. If at any time the shape of the ice piece is altered, this will indicate that the freezer has failed, the food product has probably thawed and could be spoiled. Such a procedure is useful when the family goes on an extended trip during which the power could go off, the product thaw, the power come back on, and the product be refrozen.

Properly prepared, blanched and frozen produce will be nutritious and flavorsome for at least a year if held below 0° F.

C. Sun drying or dehydration will usually be done by the gardener when canning or freezing is not practical. Some gardeners may wish to try drying a few items to evaluate the quality. Of course, dry beans, rice, wheat, nuts, etc. constitute the bulk of the foods consumed by man, and in some cases, drying will be the chosen preservation method. We have already noted that peas and beans which are too mature for canning or freezing should be left to dry and should be harvested, shelled and stored dry for later use. For the gardener who wishes to try some of the not so commonly dried products, the following procedure should be followed:

1. Select good quality produce, sort out damaged, decayed or otherwise unsuitable units.

2. The best maturity level of the dried produce corresponds with the ideal stage of maturity for fresh use.

3. Wash the produce thoroughly but do not soak it.

4. Blanch the product according to the information in Table 10-4.

Table 10-4

Food Product	**Time in Minutes in Boiling Water**
Beans, and peas, dried, shelled	5
Beans, snap	15
Corn	8
Okra	3
Onions	2
Peppers	Not necessary
Beets	Steam 35 minutes, as water will leach out the red color
Roots crops	Large pieces or whole—steam 25 minutes

Upon completion of the blanch, drain off the free water, reduce the particle size to that usually served, i.e., cut corn from the cob, dice or slice carrots and beets, etc. Spread the product on trays not exceeding 1" deep. Place the trays in the oven or other dryer if available. Start the drying at about 120°-140° F for most products and increase the temperature gradually not exceeding 150° F at any time. When the product is dry and no further water can be removed, cool the food, place the dried product in large plastic or plastic-lined containers and stir it frequently for from 1 to 2 weeks. This permits moisture equilization throughout the mass of product.

Spread the dried product on trays once again, place the trays in the oven and bring the temperature to 175° F and hold 15-20 minutes to pasteurize the dried products. Cool the food, place it in packages which will exclude water vapor and store in a cool, dry, dark place until used. Glass jars or good heat-sealed plastic pouches are excellent for dried foods.

APPENDICES

Appendix A

Prepared By:

Dr. Milo Burnham and Dr. Jesse Harness[*]

WHEN TO PICK VEGETABLES

One of the most important phases of home vegetable gardening is harvesting. Picked-too-soon garden produce is tough or too tender and lacks substance or flavor. Picked too late, it is likely to be too tough, fibrous, or squashy and also lacking in taste. The number of days from planting to maturity given in Information Sheet 504, "Popular Vegetable Varieties for 1975" is an average and will vary with the weather and variety. Use the number of days as a guide, but also consider the appearance of the vegetables.

Beans, snap—best when the pods snap readily but the tips are still pliable. 50 days for bush; 65 days for pole.

Beans, lima—pick when the pods are well-filled but still bright and fresh. End of the pod should feel spongy when squeezed. 75 days for bush; 80 days for pole.

Beets—harvest when medium sized (1-1/4 to 2 inches in diameter).

Broccoli—stalks should be firm but tender, buds compact and not showing color of flowers (occasional flower open not a sign of over maturity). 70 days.

Cabbage—pick when heads are firm when squeezed, heavy for size, and before splitting. 65 days.

Cantaloupe—ready when blossom end of fruit gives to pressure from finger and fruit separates (slips) readily from stem. Netting should be coarse, cordy, prominent, and grayish, with no green lines showing. 90 days.

Carrots—like beets, sugar content higher in mature specimens but younger ones more tender. 75 days.

Cauliflower—pick before ricey, discolored, or blemished. Heads should be firm and a clean white. Softness or yellowing flowers or leaves indicates over-maturity or insufficient water. 60 days.

Collards—as soon as leaves are large enough to pick. Large, old leaves tough and fibrous. 55 days.

Corn—pick when silk turns dark and begins to shrivel. Kernels should be bright, plump, and milky. If small and soft, they are tasteless; if large and hard, starchy and flavorless. 80 days.

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[*] **Information Sheet 707**—Extension Service of Mississippi State University and Alcorn State University, Cooperating with U.S. Department of Agriculture. Published in furtherance of Acts of Congress, May 8 and June 30, 1914. W.M. Bost, Director.

Cucumber—best when moderate size, a good green, firm, and spines just beginning to soften. Past prime if large, dull, puffy, and yellowing. 55 days.

Eggplant—best when fruits half grown, ready just before color dulls. 85 days.

Kale—harvest entire plant or take larger leaves while young. Old kale is tough and stringy. Cold weather improves flavor. 55 days.

Kohlrabi—pick when swollen part is size of golf ball. Woody and tasteless when older. 55 days.

Lettuce, leaf—when leaves large enough to pick. 50 days.

Lettuce, head—as soon as headed. Both run to seed if left too long. 80 days.

Mustard—as soon as large enough to pick. Old leaves tough. 45 days.

Okra—pick pods when 2—4 inches long. Tough when larger. 65 days.

Onions, green—pick when 1/4 to 1/2 inch in diameter.

Onions, bulb—pick when tops have died. 130 days.

Parsley—when leaves are large enough to pick. 90 days.

Peas, English—best when still bright green and pods fairly well filled. Flat, dark green pods are immature; yellowish and hard ones are old. Peas should be very sweet when raw. 65 days.

Peas, Southern—pick purple hulled varieties when pod is 50 percent purple or less. Fully purple pods too old and dry. Pick tan podded varieties when pods show hint of yellow. Peas should be green when shelled. 75 days.

Pepper—is firm and a good, shining green in prime. Also good when allowed to become red. Pimiento should be fully red. 75 days.

Potato, Irish—as soon as large enough for early potatoes, but harvest main crop after tops have died. Greenish or sunburned tubers are not good. Skin should be firmly attached to tuber. 100 days.

Potato, sweet—when roots have reached a usable size. Certainly before frost or ground cools below 50 degrees. 120 days.

Radish—pull as soon as large enough. Spilt, pithy, or spongy radishes not crisp. 25 days.

Rutabaga—dig any time large enough. Become dry and woody if soil moisture insufficient. 110 days.

Spinach—use before leaves get old and tough. 45 days.

Squash, summer—pick when moderate-sized, color good, and rind easily dented with thumbnail. 45 days.

Squash, winter—color shoud be good for variety and rind firm enough so it is not readily penetrated by thumbnail. 90 days.

Swiss chard—as soon as large enough to pick off leaves, from about 12 inches up. Old leaves tough and fibrous. 50 days.

Tomato—pick when color is good all over. Size no indication of maturity. Will ripen off the vine, but vine ripened is better. 80 days.

Turnip, greens—when large enough to pick. Tough, fibrous, and bitter when old.

Turnip, roots—best when of moderate size, firm, and reasonably heavy. Overgrown ones tough, woody, and too strongly flavored. 60 days.

Watermelon—ripe when undersurface turns from white to cream-yellow. 85 days.

HARVEST HIGH QUALITY VEGETABLES

Keep these points in mind when harvesting vegetables:

1. Harvest at the proper stage of maturity, not before. Most crops can be harvested several times if only the part that is ready is harvested.
2. Harvest on time. Okra, for instance, must be harvested every two or three days. Pods that become large, tough, and unusable decrease future production. This also applies to summer squash, beans, and cucumbers.
3. Harvest when the foliage is dry. Tramping through wet foliage scatters disease spores and helps spread the disease.
4. Don't damage foliage by stepping on vines or breaking stems. This creates a wound through which disease can enter the plant.
5. Don't harvest when the plant is wilted. Wounds made by harvesting permit water loss. This increases water stress inside the plant.
6. Move freshly harvested vegetables immediately into the shade and keep them cool.
7. Use freshly harvested vegetables as soon after harvest as possible.
8. Do not injure the plant needlessly during harvest. Gently remove the part to be harvested from the plant. Cut eggplants and watermelons with a knife. Cut okra that won't snap off.

Appendix B

Chemical Weed Control

For most home gardens, chemical weed control is impractical for the following reasons:

1. No one herbicide is approved for use on all garden crops.
2. Drift of herbicide spray from one area to another may cause serious damage to other plants.
3. Most gardeners do not have proper equipment for applying herbicide sprays in the proper amounts over a specific area.

Under certain conditions however, herbicides can be effectively used in the garden. Extreme care should be used to prevent injury to the plants being grown in the garden. All directions on the herbicide container should be read and understood fully. The garden should be planned so that several vegetables can be grown in the same area treated with the herbicide. This area should be clearly and permanently marked off. If possible, the gardener should use the 5 percent granular formulations which do not require mixing and can be applied with a fertilizer distributor in a broadcast manner.

Table B-1 on the following page lists 4 common herbicides which can be used on several different vegetables. Recommendations are those given in the publication, 1975: Weed Control Recommendations for Mississippi. This publication also contains other recommended herbicides for use on other vegetables. They are current for the year 1975. For current recommendations consult the local vocational agriculture teacher or county agent.

Two names are given for each herbicide listed. The first name is the chemical name of the herbicide. The second name in parentheses is the name under which the herbicide is marketed. The mention of trade names is not for purposes of endorsement or criticism, but solely for the purpose of identifying chemicals.

Table B-1

Herbicide	Crop	Rate of Application	Time of Rate of Application	Remarks
trifluralin (Treflan)	Lima Beans Snap beans Cabbage Okra Pepper Southern Peas Tomatoes	.5 to .75 lbs. active material per acre or .4 fluid oz. per 1000 sq. ft. in 1 gal. of water or 4 oz. of 5% granular per 1000 sq. ft.	1-3 weeks before planting	Incorporate into the soil to a depth of 1 to 1-1/2 inches. Controls grass seedlings, pigweed, purslane, and other small seeded grasses and weeds. No corn within 6 months.
Dcpa (Dacthal)	Lima Beans Snap Beans Cabbage Cantaloupe Cucumber Collard Greens Turnip Greens Pepper Southern Peas Squash Tomatoes Watermelon	6 to 8 lbs. active material per acre or 3-4 oz. wettable powder per 1000 sq. ft. in water or 3 lbs. 5% granular per 1000 sq. ft.	Immediately after planting except for: 1. cantaloupe, cucumber, & watermelon-apply when vines begin to form 2. squash—apply at lay-by	Apply broadcast. Wettable powder must be throughly agitated during spraying. Controls grass seedlings, purslane, wild verbena, and chickweed.
DCPA diphenamid (Enide or Dymid)	Pepper Irish Potatoes Sweet Potatoes Tomatoes	4 to 6 lbs. active material per acre or 3-4 oz. /1000 sq. ft. of Enide 50W wettable powder in water or 2 oz. of Dymid 80W wettable powder in water/1000 ft. or 2.3 lbs./1000 sq. ft. of Dymid 5% granular	Immediately after planting or transplanting	Should receive overhead water (rain or sprinklers) 7 to 10 days after application for best results. Apply broadcast. Controls grass seedlings, pigweed, chickweed, smartweed, and lambsquarter
atrazine or simazine (AAtrex or Princep)	Corn	2 to 4 lbs. active material per acre or 1-1/2 oz. AAtrex 80% wettable powder in water per 1000 sq. ft. 1 1/4 fluid oz. AAtrex 4L liquid per 1000 sq. ft. or 1-1/2 oz. Princep 80W wettable powder in water per 1000 sq. ft.	Immediately after planting	Atrazine gives better results in drier soil. Controls grasses, pigweed, purslane, and morning glory. Legumes & cucurbits should not follow Atrazine for 1 yr.

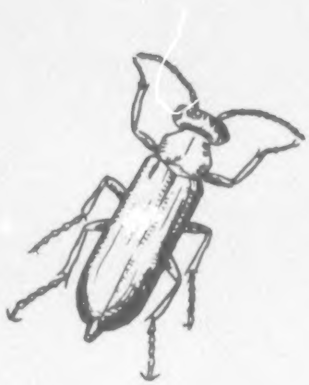
APPENDIX C

INSECT IDENTIFICATION AND CONTROL

Recommendations given are current for the year 1975 only. Some insecticides may be removed from the market in the future. For current recommendations consult the local vocational agriculture teacher or county extension agent.

Chewing Insects

Blister Beetle



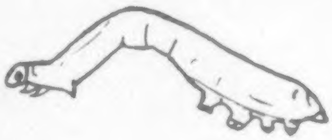
Appearance. Gray, black or striped slender beetles about 3/4 inch long.

Injury. Adult beetles eat foliage.

Plants Attacked. General feeders, will attack most garden crops, especially tomatoes.

Control. Dust with 5% Sevin or 5% methoxychlor or 4% Thiodan.
Spray. To 1 gallon of water add either 3 tablespoons 50% Sevin or 50% methoxychlor or 1 teaspoon 60% Dibrom or 1 tablespoon Thiodan.

Cabbageworms



Appearance. Cabbage loopers are pale-green measuring worms with light stripes down their back. Imported cabbageworms are velvety-green.

Injury. Feed on underside of leaves producing ragged holes. Will bore into heads.

Plants Attacked. Cabbage, collards and related plants.

Control. Same as for Mexican bean beetle. Also recommended is 60% Dibrom at the rate of 1 teaspoon per gallon of water. Also Pipel Biotrol or Thuricide 1 1/2 oz. /1000 sq. ft. in 1 gal. water.

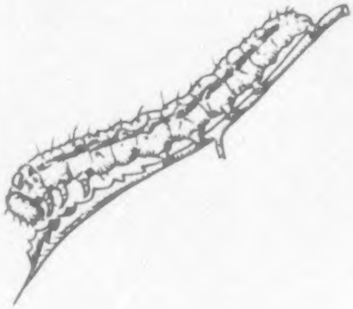
Corn Earworm

Appearance. Green, pinkish or brown worms with light stripes along their sides and on back. Range in size up to 1 3/4 inches.

Injury. Early in the season when earworms feed in the whorl they are usually called budworms. Later burrow into silk and feed on kernel near tip of ear.

Plants Attacked. Corn and tomatoes in gardens.

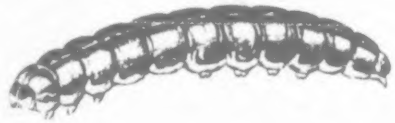
Control. Begin dusting or spraying when first silks appear. Apply 4 treatments 2 to 3 days apart. Treat tassel and ear area of stalk thoroughly. Spray directly into bud or whorl for budworm control when worms first appear.
Dust with 7 1/2% to 10% Sevin.
Spray. To 1 gallon of water add 3 tablespoons of 50% Sevin.



Cutworms

Appearance. Cutworms are dull gray, brown or black and may be striped or spotted. Most species hide under the soil during the day and feed at night.

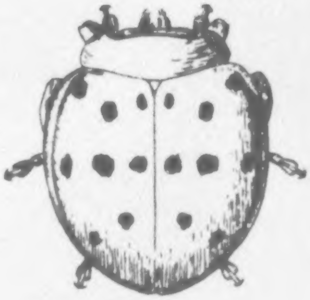
Injury. Cut plants off above or below soil surface. Some will climb plants and feed on leaves, buds or fruits. Most damage occurs in early spring to young plants.



Plants Attacked. Nearly all vegetables.

Control. Treat soil on top of row at planting with 20% toxaphene or 7 1/2% to 10% Sevin.
Spray. To 1 gallon of water add either 1 tablespoon 60% toxaphene or 3 tablespoon of 50% Sevin.

Mexican Bean Beetle



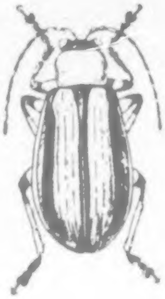
Appearance. Adult is yellow to copper colored with 16 black spots on its wings. Larvae are yellow, soft-bodied grubs with spines on their backs.

Injury. Adults and larvae feed on underside of leaves, giving them a lace-like appearance.

Plants Attacked. All kinds of beans.

Control. Dust with 5% Sevin or 5% methoxychlor or 5% malathion or 1 1/2% malathion or 1 1/2% rotenone.
Spray. To 1 gallon of water add either 3 tablespoons 50% Sevin or 50% methoxychlor or 1 teaspoon of 48% diazinon or 2 teaspoons of 57% malathion or 4 tablespoons of 5% rotenone or 1 tablespoon Thiodan.

Striped Cucumber Beetle



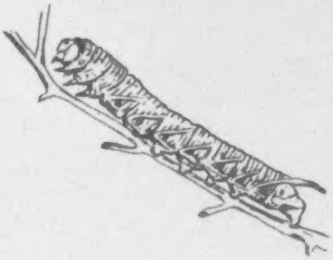
Appearance. Adults are yellow to black with 3 stripes on wing covers. The larvae are slender white, brownish at the ends and up to 1/3 inch long.

Injury. Adults eat leaves, stems and fruit. Larvae bore into roots and stems below soil line.

Plants Attacked. Insects usually attack tender, young plants such as cantaloupe, cucumber, squash and watermelon.

Control. Dust with 5% Sevin or 5% methoxychlor or 5% malathion or 1 1/2% rotenone or 4% Thiodan. (Do not use Sevin on cantaloupe or watermelon; injury may result.)
Spray. To 1 gallon of water add either 3 tablespoons of 50% Sevin or 50% methoxychlor or 1 teaspoon of 48% diazinon or 2 teaspoons 57% malathion or 4 tablespoons of 5% rotenone or 1 tablespoon Thiodan.

Tomato Hornworm and Tomato Fruitworm



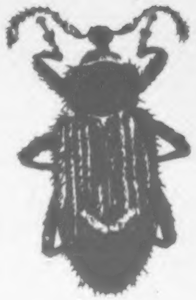
Appearance. Tomato hornworms are large worms, green with diagonal lines on sides. Have prominent horn on rear end. Tomato fruitworms are green, pinkish or brown worms with light stripes along their sides and on back. Range in size up to 1 3/4 inch.

Injury. Eat foliage and fruit.

Plants Attacked. Eggplant, pepper, tomato and related plants.

Control. Same as for blister beetles.

Vegetable Weevil



Appearance. Adult weevils are grayish-brown with light colored "V" on wing covers. Larvae are light-green with light-yellow heads.

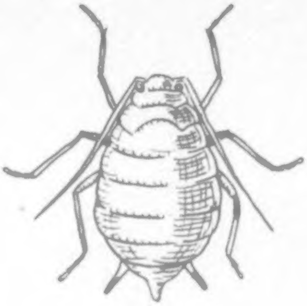
Injury. Adults and larvae feed on leaves and roots of crops. Grubs bore into turnips and other root crops.

Plants Attacked. Cabbage, carrot, potato, radish, tomato, turnip and related plants.

Control. Same as striped cucumber beetle.

Sucking Insects

Aphids (Plant Lice)



Appearance. Small soft-bodied sucking insects. Vary from greenish to black.

Injury. Suck sap from leaves causing curled leaves and yellowish plants.

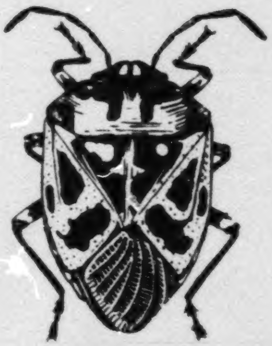
Plants Attacked. Most vegetables but they are worse on cabbage, mustard, peas, turnip and related plants.

Control. Dust with 5% malathion or 1 1/2% rotenone or 4% Thiodan.

Spray. To 1 gallon of water add either 2 teaspoons of 57% malathion or 1 teaspoon 48% diazinon or 1 teaspoon of 40% nicotine sulfate or 1 teaspoon of 60% Dibrom or 4 tablespoons of 5% rotenone or 1½ teaspoons of 25% Cygon or 1 tablespoon Thiodan.

Caution. Diazinon and Cygon can only be used on certain vegetables. See restrictions.

Harlequin Cabbage Bug



Appearance. Black and brilliantly colored with red or yellow. They are shield-shaped insects.

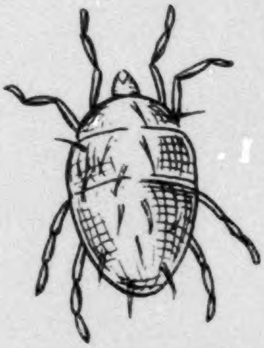
Injury. Suck sap from plant, causing plants to wilt and die.

Plants Attacked. Cabbage, collard, mustard, turnip and related plants.

Control. Dust with 5% Sevin or 20% sabadilla or 4% Thiodan.

Spray. To 1 gallon of water add either 3 tablespoons of 50% Sevin or 1 teaspoon of 60% Dibrom or 1 tablespoon Thiodan.

Spider Mites



Appearance. Adults and young are barely visible to naked eye. They are light green to red.

Injury. Spider mites are found on underside of leaves. Yellow specks and fine webs will appear on leaves. Can cause leaf defoliation and reduced yields.

Plants Attacked. Attack bean, cucumber, tomato, strawberry and related plants.

Control. Dust with 2 to 3% kelthane or 5% malathion.

Spray. To each gallon of water add either 1 teaspoon of 18.5% kelthane E.C. or 1 tablespoon 25% kelthane W.P. or 2 teaspoons 57% malathion or 1 teaspoon 25% diazinon or 1½ teaspoons 25% Cygon.

The information given here is for educational pruposes only. Reference to commercial products or trade names is made with the understanding that no discrimination is intended of other products that may also be suitable.

Recommendations are taken from Mississippi Cooperative Extension Service Information Bulletin 566 by Dr. David F. Young, Jr. and James H. Cochran, Entomologists.

RESTRICTIONS

DAYS FROM LAST INSECTICIDE APPLICATION TO HARVESTING VEGETABLES

Cygon (dimethoate)

Bean, peas, pepper, and potato—No time limitation.
Cabbage—Allow 3 days before harvest.
Broccoli, cauliflower, lettuce (head), tomato and watermelon—Allow 7 days before harvest.
Collards, kale, lettuce (leaf), mustard greens, spinach, turnip greens and roots—Allow 14 days before harvest.

Not approved for use on vegetables not listed.

Diazinon

Peas—No time limitation as to days.
Tomato—Allow 1 day before harvest.
Watermelon—Allow 3 days before harvest.
Broccoli, cauliflower, pepper and strawberry—Allow 5 days before harvest.
Beans, cabbage, cucumber and squash—Allow 7 days before harvest.
Carrot, collard, kale, lettuce, onion, radish, spinach and turnp—Allow 10 days before harvest.
Potato—Allow 14 days before harvest.
Mustard—Do not use diazinon on mustard as foliage spray.

Dibrom (naled)

Cucumber, potato, squash—No time limitation before harvest.
Broccoli, cabbage, cauliflower, eggplant, lettuce, melons, peas, pepper, spinach, strawberry, tomato and turnip—Allow 1 day before harvest.
Collard, kale, mustard, peas, onion (bulb only)—Allow 4 days before harvest.

Kelthane

Potato—No limitations.

Cantaloupe, cucumber, eggplant, pepper, squash, strawberry, tomato, watermelon—Allow 2 days before harvesting.

Beans—Allow 7 days before harvesting.

Malathion

Potato and sweetpotato—No time limitation.

Beans, cucumber, squash, and tomato—Allow 1 day before harvest.

Broccoli, cowpea, eggplant, onion, peas, pepper, strawberry, turnip—Allow 3 days before harvest.

Beet, cabbage, carrot, cauliflower, collard, kale, mustard, radish and spinach—Allow 7 days before harvest.

Lettuce—Allow 7 days before harvest on head lettuce; allow 14 days on leaf lettuce.

Okra—Do not apply after pods form.

Methoxychlor

Potato and sweetpotato—No time limitation.

Beans, cabbage and cowpea—Allow 3 days before harvest.

Beet, cantaloupe, carrot, cauliflower, cucumber, eggplant, onion, peas, pepper, radish, squash, tomato, and turnip (roots)—Allow 7 days before harvest.

Broccoli, collard, kale, lettuce, spinach, strawberry and turnip tops—Allow 14 days before harvest.

Mirex

Do not make more than 3 applications in 12 months.

Do not apply more than once in 2 months.

Nicotine Sulfate

No time limitations.

Rotenone

All Crops—Allow 1 day before harvest.

Sabadilla

No time limitation.

Sevin (carbaryl)

Beans, carrot, corn, cowpea, cucumber, eggplant, okra, pea, pepper, ptato (foliage only), squash, tomato and watermelon—No time limitation.

Strawberry—1 day.
Beet, broccoli, cabbage, cauliflower, head lettuce, radish and turnip—Allow 3 days before harvest.
Collard, beet and turnip tops, kale, leaf lettuce, mustard and spinach—Allow 14 days before harvest.

Thiodan (endosuplphan)

Broccoli, cabbage—Allow 7 days before harvesting.
Beans—Allow 3 days before harvesting. Do not make over 3 applications per season.
Collard, mustard, and turnip greens—Allow 21 days before harvesting. Make no more than 1 application per year.
Melons, cantatlope, and squash—No restrictions.
Eggplant, pepper, and tomato—Allow 1 day before harvesting.
Peas—Allow 3 days before harvesting. Do not feed treated vines to livestock.

Toxaphene

Vegetables—If applied to soil surface at planting time as suggested, there are no restrictions.
Use proper dosage.
Cowpeas—No limitations on use of shelled peas.

Recommendations and restrictions courtesy Dr. David F. Young and James Cochran, Extension Entomologists, Mississippi Cooperative Extension Services.

Appendix D

Disease Identification and Control

Disease	Kind	Parts Affected	Symptoms	Control
Anthracnose	Snap Bean Lima Bean Cucumber Cantaloupe Watermelon	Seed, Stem Leaves, Pod	Sunken black spots with brownish margins	Plant seed which are not infested. Spray with Bravo or Dyfonate
Bacterial Blight	Snap Bean Lima Bean	Leaves, Pod, Stem, Seed	Spots have a water-soaked (greasy) appearance which later turns brown	Plant disease-free seed.
Bacterial Wilt	Snap Bean Lima Bean Cantaloupe Cucumber	Internal structure of all parts of plant. (Vascular system is injured so that it cannot conduct water.)	Infected plant wilts and dies	Plant disease-free seed (With cantaloupe and cucumber the disease overwinters in body of cucumber beetle. Control beetles by dusting with insecticide).
Rust	Snap Bean Lima Bean	Leaves	Numerous small orange-colored pustules occur on under surface of leaf, later turn yellow and dry and fall off	Sulfur dust or wettable spray—or plant resistant varieties.
Mosaic	Most vegetable crops	Leaves Pods	Leaves become mottled with irregular areas on the green leaf, puckered, and deformed. The whole plant is sickly and stunted. Some plants may die. Formation of pods is reduced.	Transmitted by aphids. No cure except by control of aphids.
Root Knot	All vegetables common to Mississippi	Roots	Presence of galls or knots on roots which interfere with absorption of water and minerals.	Fumigate soils with "Vampam," Methylbromide, or Chloropricrin to control nematodes in small areas. Fumigants are too expensive to use on large areas. Plant crops early to avoid increased activity of nematode in warmer weather. Nematodes are worse in sandy soils. A good control on a large area is to plow the soil so as to dry it during July and August when the weather is hot. The heat and dry condition reduces the population of nematodes.

Damping-Off	Snap Bean Lima Bean Cabbage Cauilflower Turnip Mustard Broccoli Eggplant Spinach	Seed Stem	Two kinds: 1. Stem decays at soil level, plant topples over and dies. 2. Rotting of seed or seedlings while still under ground.	Occurs most often in cool damp weather. Plant after weather has turned warm, or treat seed with a fungicide, such as Arasan, at rate of one tablespoon per pound of seed.
Black Rot	Cabbage Cauliflower Turnip Mustard Broccoli	Leaves Stems	Blackening of leaf veins and internal structure of plant	Plant disease-free seed. Spray with copper hydroxide.
Downy Mildew	Cantaloupe Cucumber Squash Watermelon	Leaves	Yellowish spots, angular in shape, later the whole leaf dries and shrivels —older leaves are killed first	Plant resistant varieties or treat with one of the following: Zineb, Ferbam, or Maneb; Bravo and Dyfonate.
Wilt	Southern Peas Okra	Stem	Plant wilts and dies. Stem under the bark (vascular system) becomes brown in color	Plant resistant varieties. Example is Dixilee variety of Southern pea
Scab	Irish Potato	Tubers	Round to irregular, hard, corky areas on tubers. May grow to cover most of the surface of the potato	Treat seed with formaldehyde by dipping for four minutes into a mixture of 1 quart formalin (40% formaldehyde) to 30 gallons of water. Not a problem when planted in acidic soil.
Black Scurf	Irisn Potato	Tubers Stems	Hard, black bodies (Sclerotia) adhere to skin of tuber or cankers on stem	Same as scab.
Black Rot of Sweet Potatoes	Sweet Potato	Roots and underground part of stem	Potatoes have black rot lesions varying from very small to spots which cover the entire surface	Set only disease-free slips. (Be sure the slips have been inspected.) Treat seed potatoes with Mertect 365 or dip in 2% solution of borax for 10 minubes. Bed immediately. **Do not allow treated roots to dry.**
Scurf	Sweet Potato	Underground part	Dark brown to black stain on the skin of potatoes. The main damage is to appearance and grade	Same as black rot.
Fusarium Wilt	Tomato	Fungus penetrates roots and moves throughout vascular system of plant	Plant wilts and dies. Lower leaves show the first symptoms	Plant resistant varieties.
Blossom End Rot	Tomato	Fruit	Half-grown fruit affected. The rot starts as a water-soaked spot which enlarges, turns brown in color, and becomes dry, flat, or sunken. (Caused by a fluctuation in soil moisture and calcium)	Maintain a uniform and adequate supply of soil moisture and increase the calcium content of the soil by applying a calcic lime.

Early Blight	Tomato	Leaves, Fruit, Stems	Leaves have small irregular brown dead spots. Stems have small dark, slightly sunken areas which enlarge. Plants are weakened and may die. The plants may remain small and produce only a few fruits	Spray with Maneb, Bravo, or Dyfonate.
Septoria Leaf Spot	Tomato	Leaves Stems	Symptoms first appear on lower leaves after fruit begins to set. Early symptoms are small, water-soaked spots that may be thickly scattered over the leaves. The spots enlarge and have gray centers surrounded by dark margins with a dot in the middle. The leaf eventually dies and drops	Spray with Maneb, Bravo, or Dyfonate.
Nailhead Spot	Tomato	Fruits Leaves Stems	First symptoms resemble early blight. On the fruit the disease differs from early blight. Very small tan spots appear on the fruit. As the spots become older and larger the center sinks and takes on a grayish-brown color. Secondary organisms may enter and cause the fruit to decay	Plant resistant varieties or spray with Maneb, Bravo, or Dyfonate.
Southern Blight	Tomato Beans Cabbage Sweet Potatoes Beets Eggplants Peppers Squash Watermelons Potatoes	Leaves Stems	Symptoms include wilting and dropping of leaves and death of the plant. Foliage may not turn yellow. Stems may show a brown decay of outer tissue at the ground line	Remove and burn infected plants and rotate crops. Break soil deep in Spring and cultivate very shallow.

Caution: Follow label directions in the use of all fungicides. Allow appropriate number of days before harvest.

Appendix E

POPULAR VEGETABLE VARIETIES

Asparagus: Mary Washington

Bean, Snap: Bush—Highlander (H), Green Isle, Early Gallatin, Contender, Slenderwhite, Cherokee (wax). **Pole**—Kentucky Wonder 191, Blue Lake, Dade.

Bean, Lima: Bush—Henderson's Bush, Butterpea, Nemagreen, Jackson Wonder. **Pole**—Carolina, Willow Leaf, Florida Speckle.

Beet: Detroit Dark Red, Burpee Red Ball, Ruby Queen*

Broccoli: Gem, Coastal, Comet

Cabbage: Early Round Dutch (H), Red Acre (H), Stonehead*, Market Prize, Gourmet, Rio Verde, Red Head, Charleston Wakefield. **Chinese**—Michihli, Pe Tsai.

Cantaloupe: Edisto 47, Hale's Best No. 36.

Carrot: Red Core Chantenay, Imperator, Spartan Bonus, Danvers 126.

Cauliflower: Snowball E, Snowball M.

Chard, Swiss: Fordhook, Lucullus, Rhubarb Chard.

Collard: Vates.

Corn, Sweet (order of maturity): Jubilee, Royal Gold, Aristogold Bantam Evergreen, Merit, Golden Security, Seneca Chief, Midway, Silver Queen.

Cucumber: Pickling—Pioneer, Explorer. **Slicing**—Ashley, Gemini

Eggplant: Black Beauty, Florida Market.

Kale: Dwarf Siberian, Vates.

Kohlrabi: White Vienna.

Lettuce: Head— Great Lakes 118, Imperial 847. **Leaf**—Grand Rapids, Salad Bowl*, Slobolt, Buttercrunch, Black Seeded Simpson (H).

Mustard: Florida Broadleaf, Southern Giant Curled, Tendergreen.

Okra: Clemson Spineless*, Emerald.

Onion: Spring—Crystal Wax. **Overwintering**— Early Supreme, New Mexico White Grano, Ringer, Granex, Ring Gold, Red Star.

Parsley: Moss Curled.

Peas: English—Little Marvel, Laxton, Creole, Wando. **Southern**—Mississippi Silver, Mississippi Purple, Dixilee, Pinkeye Purple Hull, Magnolia Blackeye.

Pepper: Sweet— Miss Belle, Keystone Resistant Giant, Yolo Wonder L, Sweet Banana*. **Hot**—Long Cayenne, Tabasco, Hungarian Wax, Jalapeno.

Potato: Irish—Red LaSoda, LaChipper, Superior, Norchip. **Sweet**—Centennial, Jewel, Jasper, Unit 1 Porto Rico, Goldrush.

Pumpkin: Jack-O-Lantern, Connecticut Field, Thomas Halloween.

Radish: Cherry Belle*, Scarlet Globe, White Icicle.

Rutabaga: America Purple Top.

Salsify: Mammoth Sandwich Island.

Spinach: Early Hybrid No. 7, Bloomsdale Longstanding, Dixie Market, Chesapeake Hybrid, New Zealand (summer).

Squash: Summer—Early Yellow Summer Crookneck, Early Prolific Straightneck*, Aristocrat (zucchini)*, Patty Pan (white scallop). **Winter**—Table Queen (acorn), Butternut, Buttercup, Cushaw.

Tomato: Marion, Floradel, Traveler, Better Boy (H), Bonus (early), Spring Giant (early)*.

Turnip: Purple Top White Globe, Shogoin (for greens), Just Right*, Crawford.

Watermelon: Charleston Gray, Jubilee, Crimson Sweet, Petite Sweet (H).

(H) recommended especially for home garden
*All-America Selection Winner

APPENDIX F

A PARTIAL LIST OF SELECTED SEED COMPANIES

1. Asgrow Seed Company, Inc..
   Kalamazoo, MI 49001

2. W. Atlee Burpee Company, Inc.
   Clinton, IA 52732

3. Ferry-Morse Seed Company, Inc.
   P.O. Box 100
   Mountainview, CA 94040

4 Joseph Harris Seed Company
   Rochester, NY 14624

5. Keystone Seed Company
   9870 Fairview Road
   Hollister, CA 95023

6. Northrup, King & Company
   1500 Jackson Street, N.E.
   Minneapolis, MN 55413

7. Stokes Seeds, Inc.
   Box 548
   Buffalo, NY 14240

The companies listed on this page are provided as a reference to the reader for obtaining seed catalogs. This list is not meant to be an endorsement or a complete listing of seed companies.

Appendix G

GROWING SPECIFIC VEGETABLES

Asparagus (See Figure G-1)

Asparagus is among the earliest of spring vegetables. An area about 20 feet square, or a row 50 to 75 feet long, will supply plenty of fresh asparagus for a family of five or six persons, provided the soil is well enriched and the plants are given good attention. More must be planted if a supply is to be canned or frozen.

Asparagus does best where winters are cold enough to freeze the ground to a depth of a few inches at least. In many southern areas the plants make a weak growth, producing small shoots.

The crop can be grown on almost any well-drained, fertile soil, and there is little possibility of having the soil too rich, especially through the use of manure. Loosen the soil far down, either by subsoil plowing or by deep spading before planting. Throw the topsoil aside and spade manure, leaf mold, rotted leaves, or peat into the subsoil to a depth of 14 to 16 inches; then mix from 5 to 10 pounds of a complete fertilizer into each 75-foot row or 20-foot bed.

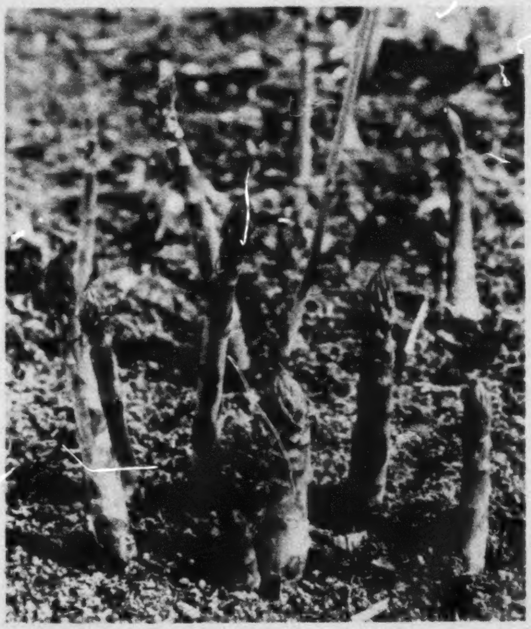


Figure G-1

Asparagus is grown for the young shoots or sprouts. It is one of the earliest spring vegetables but has a relatively short season in the deep South. Photo courtesy Burpee Seeds.

When the soil is ready for planting, the bottom of the trench should be about 6 inches below the natural level of the soil. After the crowns are set and covered to a depth of an inch or two, gradually work the soil into the trench around the plants during the first season. When set in beds, asparagus plants should be at least 1-1/2 feet apart each way; when set in rows, they should be about 1-1/2 feet apart with the rows from 4 to 5 feet apart.

Asparagus plants, or crowns, are grown from seed. The use of 1-year-old plants only is recommended. These should have a root spread of at least 15 inches, and larger ones are better. The home gardener will usually find it best to buy his plants from a grower who has a good strain of a recognized variety. Mary Washington and Waltham Washington are good varieties that have the added merit of being rust resistant.

For a 75-foot row, an application of manure and 6 to 8 pounds of a high-grade complete fertilizer, once each year, is recommended. Manure and fertilizer may be applied either before or after the cutting season.

Remove no shoots the year the plants are set in the permanent bed and keep the cutting period short the year after setting. Remove all shoots during the cutting season in subsequent years.

Beans (See Figures G-2, G-3 and G-4)

Green beans, both snap and lima, are more important than dry beans to the home gardener. Snap beans cannot be planted until the ground is thoroughly warm. Snap beans may be grown during the fall and spring, but they are not well adapted to midsummer.

Green beans are adapted to a wide range of soils as long as the soils are well drained, reasonably fertile, and of such physical nature that they do not interfere with germination and emergence of the plants. Soil that has received a general application of manure and fertilizer should need no additional fertilization. When beans follow early crops that have been fertilized, the residue of this fertilizer is often sufficient for the beans.

Lima beans need a growing season of approximately 4 months of relatively warm weather. There are two types—the small seeded "butter-beans" and the large seeded or Fordhook. The small seeded type mature in a shorter period than the large seeded.

Lima beans may be grown on almost any fertile, well-drained, mellow soil, but it is especially desirable that the soil be light-textured and not subject to baking, as the seedlings cannot force their way through a hard crust. Lima beans need a soil somewhat richer than is necessary for snap beans, but the excessive use of fertilizer containing a high percentage of nitrogen should be avoided.

Both the small—and large-seeded lima beans and snap beans are available in pole and bush varieties.

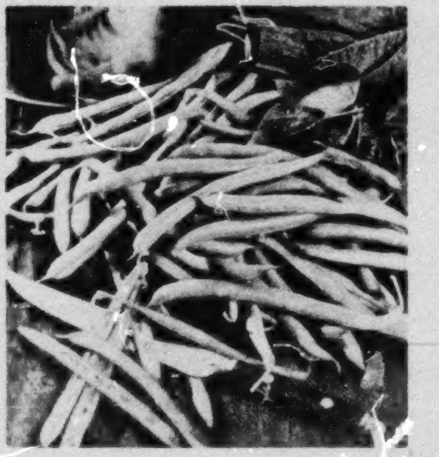


Figure G-2

Snap beans are grown for the edible immature pod. They are well adapted to Mississippi as a spring or fall crop. Photo courtesy Burpee Seeds.

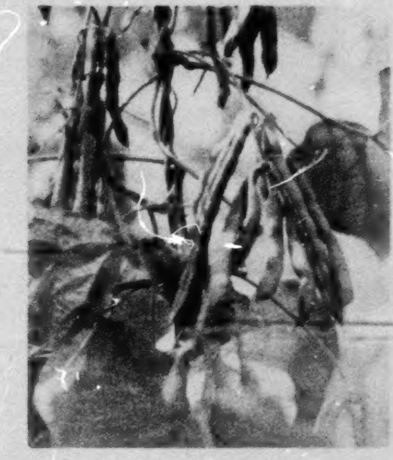


Figure G-3

Snap beans (and lima beans) may be either pole or bush type. Pod distribution on a pole type snap bean is shown above.

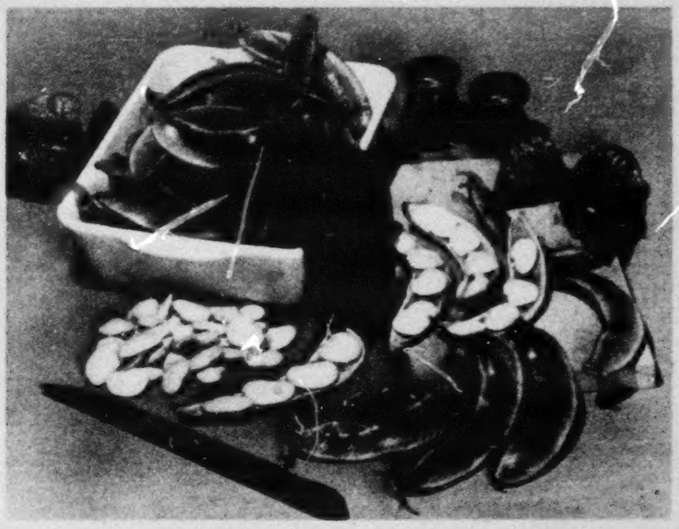


Figure G-4

Lima beans or butter beans are grown for the immature edible seeds. They are primarily a spring to early-summer crop but can also be grown in the fall. Photo courtesy Burpee Seeds.

Southern Peas

Southern peas, also known as cowpeas, blackeye peas, crowder peas, purplehull peas, etc., are highly nutritious, tasty and easily grown. Do not plant until danger of frost has passed because they are very susceptible to cold. Heavy applications of fertilizer should not be used for Southern peas. Fertilize moderately with a low-nitrogen analysis such as 4-12-12. Nitrogen applications above 10 to 15 lbs. may cause excessive vegetative growth and little or no fruit set.

For the effort necessary to grow them, few if any other vegetables will pay higher dividends than Southern table peas.

Beets (See Figure G-5)

The beet is well adapted to all parts of the country. It is fairly tolerant of heat, it is also resistant to cold. However, it will not withstand severe freezing.

Beets are sensitive to strongly acid soils, and it is wise to apply lime if a test shows the need for it. Good beet quality depends on quick growth; for this the land must be fertile, well-drained, and in good physical condition.

Where cultivating is by hand, the rows may be about 16 inches apart; where it is by tractor, they must be wider. Beet seed as purchased consists of small balls, each containing several seeds. On most soils the seed should be covered to a depth of about an inch. After the plants are well established they should be thinned to stand 2 to 3 inches apart in the rows.

Figure G-5

Beets are grown primarily for the root; however, some use the foliage as greens. They are well adapted to late-fall and early-spring production in Mississippi. Photo courtesy Burpee Seeds.

Broccoli (See Figure G-6)

Broccoli is one of the newer vegetables in American gardens, but has been grown by Europeans for hundreds of years.

Broccoli is grown in the same way as cabbage. Plants grown indoors in the early spring and set in the open as soon as danger of a killing frost has passed, begin to yield sprouts about 10 weeks later. The fall crop may be handled in the same way as late cabbage, except that the seed is sown later. The sprouts carrying flower buds are cut about 6 inches long, and other sprouts arise in the axils of the leaves, so that a continuous harvest may be otained until a hard freeze occurs.

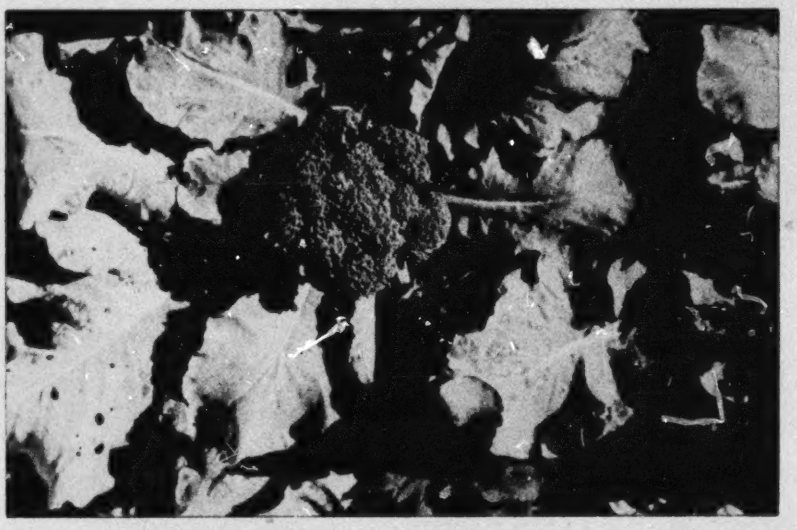


Figure G-6

Broccoli, one of the newer vegetables, is much better as a fall crop than as a spring crop. It will not tolerate as much cold or heat as cabbage.

Brussels Sprouts

Brussels sprouts are somewhat more hardy than cabbage and will live outdoors over winter in all the milder sections of the country. They may be grown as a winter crop in the South and as early and late as cabbage in the North. The sprouts, or small heads, are formed in the axils (the angle between the leaf stem and the main stalk) of the leaves. As the heads begin to crowd, break the lower leaves from the stem of the plant to give them more room. Always leave the top leaves; the plant needs them to supply nourishment.

Cabbage (See Figure G-7)

Cabbage ranks as one of the most important home-garden crops. It can be grown in all seasons except summer, as its extreme hardiness enables it to live over winter at relatively low temperatures and thus become one of the first spring garden crops.

Cabbage is adapted to widely different soils as long as they are fertile, of good texture, and moist. It is a heavy feeder; no vegetable responds better to favorable growing conditions. Quality in cabbage is closely associated with quick growth. Both compost and commercial fertilizer should be liberally used. In addition to the applications made at planting time, a side dressing or two of nitrate of soda, sulfate of ammonia, or other quickly available nitrogenous fertilizer is advisable. These may be applied sparingly to the soil around the plants at intervals of 3 weeks, not more than 1 pound being used to each 200 square feet of space, or, in terms of single plants, l/3 ounce to each plant. For late cabbage the supplemental feeding with nitrates may be omitted. Good seed is especially important. Only a few seed is needed for starting enough plants for the home garden, as 2 or 3 dozen heads of early cabbage are as many as the average family can use.

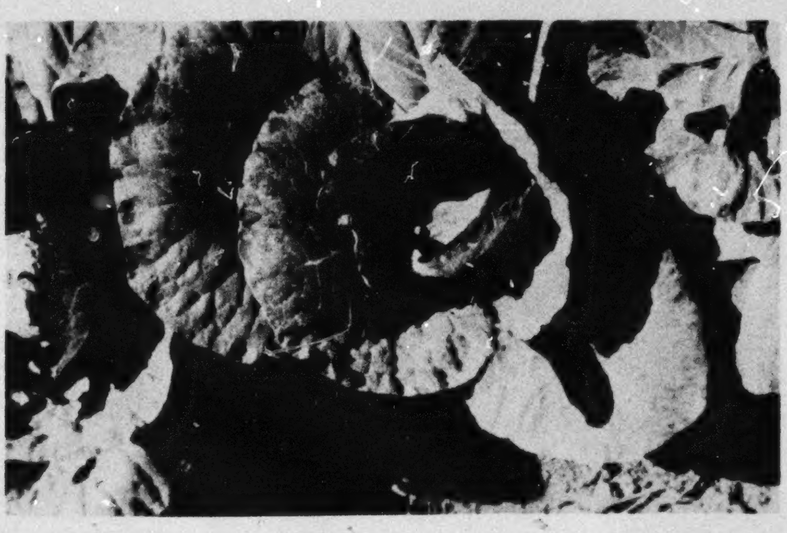


Figure G-7

Cabbage is widely grown in Mississippi and is a popular fall, winter and spring vegetable in much of the state.

Chinese Cabbage (See Figure G-8)

Chinese cabbage is more closely related to mustard than to cabbage. It is variously called Crispy Choy, Chihili, Michili and Wong Bok. Also, it is popularly known as celery cabbage, although it is unrelated to celery. The nonheading types deserve greater attention.

Chinese cabbage seems to do best as an early spring or late fall crop. The plant demands a very rich, well-drained but moist soil. The seeds may be sown and the plants transplanted to the garden, or the seed may be drilled in the garden rows and the plants thinned to the desired stand.

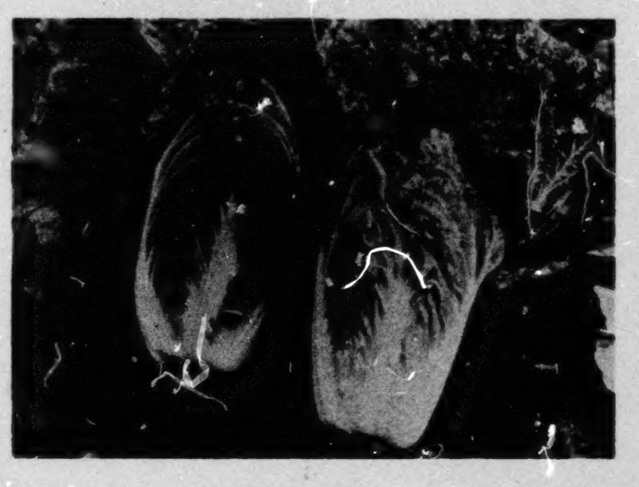


Figure G-8

Chinese cabbage can be grown in Mississippi. The head is much more elongated than the true cabbage. Photo courtesy Burpee Seeds.

Cauliflower (See Figure G-9)

Cauliflower is a hardy vegetable but it will not withstand as much frost as cabbage. Too much warm weather keeps cauliflower from heading. In the South, its culture is limited to fall and spring.

Cauliflower is grown on all types of land from sands to clay and peats. Although the physical character is unimportant, the land must be fertile and well drained. Manure and commercial fertilizer are essential.

The time required for growing cauliflower plants is the same as for cabbage. The main cause of failure with cauliflower in the spring is delay in sowing the seed and setting the plants. The fall crop must be planted at such a time that it will come to the heading stage in cool weather.

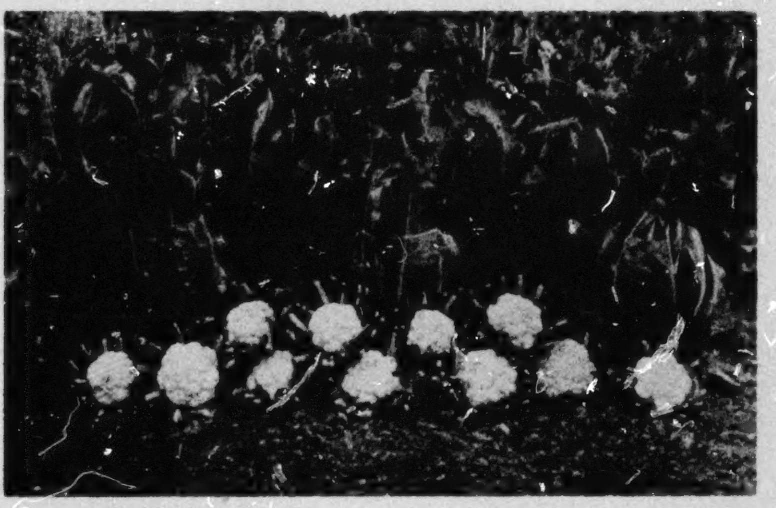


Figure G-9

Cauliflower, another member of the cabbage family, is better as a fall crop. It is very sensitive to temperature fluctuations. Photo courtesy Burpee Seeds.

Carrots (See figure G-10)

Carrots are usually grown in the fall, winter and spring in the South, providing an almost continuous supply. Carrots will grow on almost any type of soil as long as it is moist, fertile, loose and free from clods and stones, but sandy loams and peats are best. Use commercial fertilizer.

Because of their hardiness, carrots may be seeded as early in the spring as the ground can be worked. Succession plantings at intervals of 3 weeks will insure a continous supply of tender carrots. Cover carrot seed about 1/2 inch on most soils; less, usually about 1/4 inch, on heavy soils. With care in seeding, little thinning is necessary; carrots can stand some crowding, especially on loose soils. However, they should be no thicker than 10 to 15 plants per foot of row.

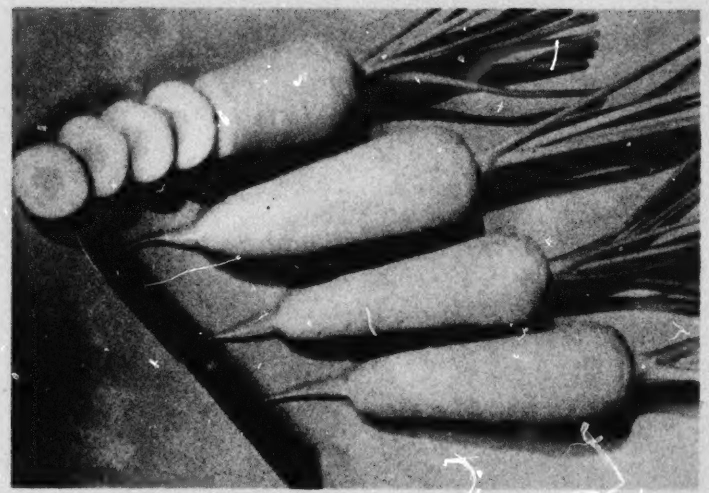


Figure G-10

Carrots do well as a late fall, winter and spring crop. They are relatively easy to grow on fairly sandy soils. Photo courtesy Burpee Seeds.

Cucumbers (See Figure G-11)

Cucumbers are a warm-weather crop. The extreme heat of midsummer is too severe, and cucumber culture is limited to spring and autumn.

The cucumber demands fertile, mellow soil high in organic matter. Commercial fertilizer, such as 9-12-12 at 5 pounds per 100 foot row, plus a side-dress application of 1 pound of ammonium nitrate, is enough. Mix the fertilizer well with the top 8 to 10 inches of soil.

For an early crop, the seed may be started in berry boxes or pots in a hotbed, and moved to the garden after danger of late frost is past. During the early growing and in cool periods, cucumbers may be covered with plant protectors made of panes of glass with a top of cheesecloth, parchment paper, or muslin. A few hills will supply the needs of a family.

Cucumbers require almost constant vigilance to prevent destructive attacks by cucumber beetles. These insects not only eat the foliage, but also spread cucumber wilt and other serious diseases.

Success in growing cucumbers depends largely on the control of diseases and insect pests that attack the crop.

Removal of the fruits before any hard seeds form materially lengthens the life of the plants and increases the size of the crop.

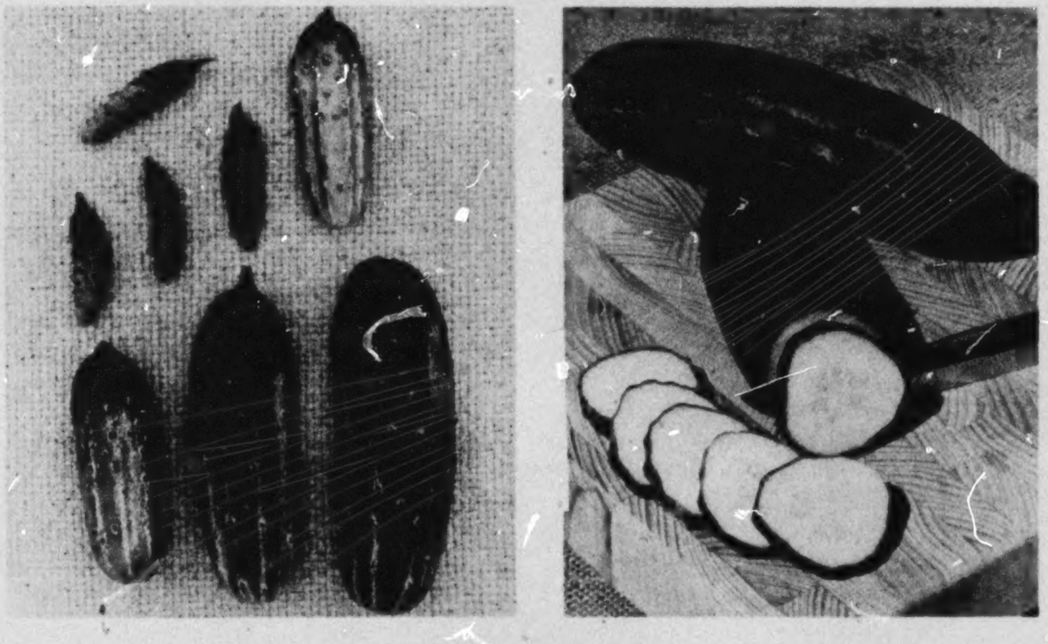


Figure G-11

Cucumbers are grown throughout Mississippi both in home gardens and for processing companies. The pickling type (above, left) is grown for processing and the slicing type (above, right) is primarily a home-garden and fresh-market type. Photo courtesy Burpee Seeds.

Muskmelon or Canteloupe

The climate, soil and cultural requirements of muskmelons are about the same as for cucumbers, except that they are less tolerant of high humidity and rainy weather. They develop most perfectly on light-textured soils. The plants are vigorous growers, and need a somewhat wider spacing than cucumber.

Pumpkin

The gardener is seldom justified in devoting any part of a limited garden area to pumpkins, because many other vegetables give greater returns from the same space. However, in gardens where there is plenty of room and where they can follow an early crop like potatoes, pumpkins can often be grown to advantage.

The pumpkin is one of the few vegetables that thrives under partial shade. Therefore, it may be grown among sweet corn or other tall plants. Small Sugar and Connecticut Field are well-known orange-yellow-skinned varieties.

Gather and store pumpkins before they are injured by hard frosts. They keep best in a well-ventilated place where the temperature is a little above 50° F.

Squash (See Figures G-12, G-13 and G-14)

Squash are among the most commonly grown garden plants. They do well in practically all parts of the United States where the soil is fertile and moisture sufficient. Although sensitive to frost, squash are more hardy than melons and cucumbers.

There are two classes of squash varieties, summer and winter. The summer class includes the Bush Scallop, the Summer Crookneck, Straightneck, and Zucchini. All the summer squash must be used while young and tender, when the rind can be easily penetrated by the thumbnail. The winter squash include varieties such as Hubbard, Delicious and Table Queen (Acorn). They have hard rinds and are well adapted for storage.

Summer varieties, like yellow Straightneck, should be gathered before the seeds ripen or the rinds harden, but the winter sorts will not keep unless well-matured. They should be taken in before hard frosts and stored in a dry, moderately warm place.

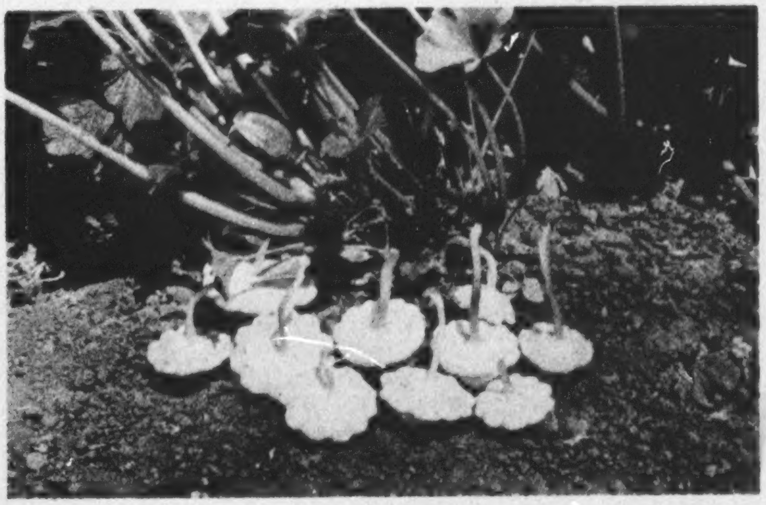


Figure G-12

The white scallop or patty pan squash is shown above. Photo courtesy Burpee Seeds.

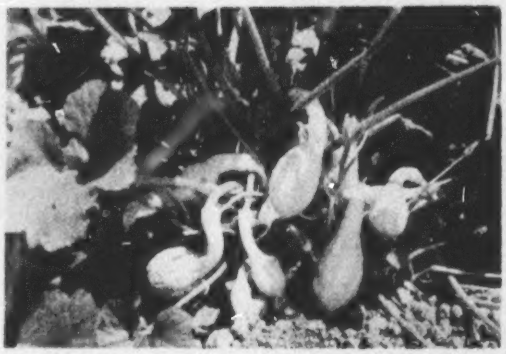


Figure G-13

Yellow summer squash or crookneck squash is shown in the above photo. The more mature fruit has wart-like areas over the surface. Photo courtesy Burpee Seeds.

Figure G-14

One of the most productive vegetables, the zucchini squash, is shown above. This Burpee Hybrid is very prolific. Photo courtesy Burpee Seeds.

Watermelon

Only gardeners with a great deal of space can afford to grow watermelons. Moreover, they are rather particular in their soil requirements, a sand or sandy loam being best. Watermelon hills should be at least 8 feet apart. The plan of mixing a half wheelbarrow load of composted material with the soil in each hill is good, provided the compost is free from the remains of cucurbit plants that might carry diseases. A half pound of commercial fertilizer also should be thoroughly mixed with the soil in the hill. It is a good plan to place several seeds in a ring about 1 foot in diameter in each hill. Later the plants should be thinned to 2 to each hill.

Chard (See Figure G-15)

Chard, or Swiss chard, is a type of beet that has been developed for its tops instead of its roots. Crop after crop of the outer leaves may be harvested without injuring the plant. Only one planting is necessary, and a row 30 to 40 feet long will supply a family for the entire summer. Each seed cluster contains several seeds, and fairly wide spacing of the seeds facilitates thinning. The culture of chard is practically the same as that of beets, but the plants grow larger and need to be thinned to at least 6 inches apart in the row. Chard needs a rich, mellow soil and it is sensitive to soil acidity.

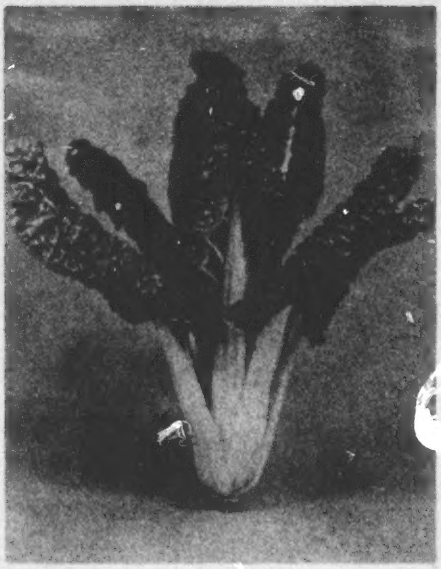


Figure G-15

Chard or Swiss chard is grown for its foliage which is prized by many as "greens." Although not widely grown in Mississippi, it does well as a late-fall, early-spring crop. Photo courtesy Burpee Seeds.

Collards

Collards are grown and used about like cabbage. They withstand heat better than other members of the cabbage group, and are well liked in the South for both summer and winter use. Collards do not form a true head, but a large rosette of leaves, which may be blanched by tying together.

Eggplant (See Figure G-16)

Eggplant is extremely sensitive to the conditions under which it is grown. A warm-weather plant, it demands a growing season of from 100 to 140 days with high average day and night temperatures. The soil, also, must be well warmed before eggplant can safely be set outdoors.

In very fertile garden soil, which is best for eggplant, a few plants will yield a large number of fruits.

Sow eggplant seeds in a hotbed or greenhouse, or, in warm areas, outdoors about 8 weeks before the plants are to be transplanted. It is important that the plants be kept growing without being stunted by low or drying temperatures or other causes. They may be transplanted like tomatoes. Good plants have stems that are not hard or woody; one with a woody stem rarely develops satisfactorily.

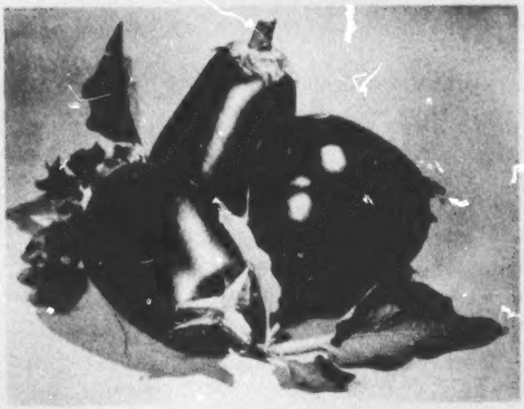


Figure G-16

A popular vegetable in southern gardens is the eggplant. The plant does remarkably well in the heat and drought of the summer months. Photo courtesy Burpee Seeds.

English Peas (See Figure G-17)

English peas are a cool-weather crop and should be planted early. They are grown in spring and fall. A few succession plantings may be made at 10-day intervals. The later plantings rarely yield as well as the earlier ones. Planting may be resumed as the cool weather of autumn approaches, but the yield is seldom as satisfactory as that from the spring planting. Peas grown on supports are less liable to destruction by birds.

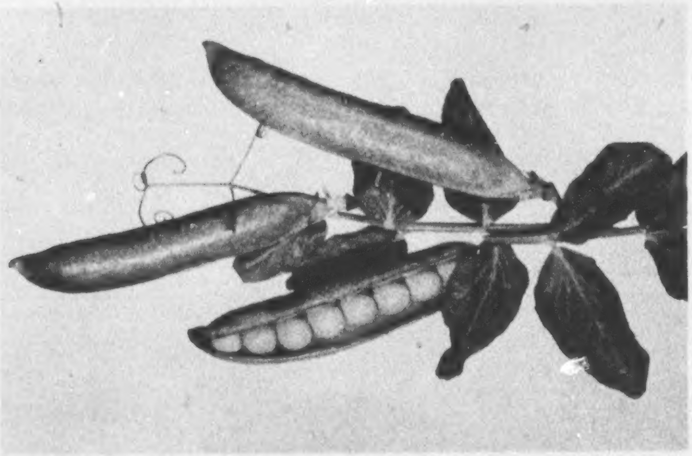


Figure G-17

A delectable garden vegetable as an early-spring or late-fall crop is the English pea. The above photo shows a portion of a branch with ripening pods. Photo courtesy Burpee Seeds.

Lettuce (See Figure G-18)

Lettuce can be grown in any home garden. It is a cool-weather crop, being as sensitive to heat as any vegetable grown. Lettuce culture is confined to late fall and spring. Planting at a wrong season is responsible for most of the failures with this crop.

Any rich soil is adapted to lettuce, although the plant is sensitive to acid soil. A commercial fertilizer with a heavy proportion of phosphorus is recommended.

Start spring lettuce indoors or in a hotbed and transplant it to the garden when the plants have 4 or 5 leaves. Gardeners need not wait for the end of light frosts, as lettuce is not usually harmed by a temperature as low as 28° F if the plants have been properly hardened. Allow about 6 weeks for growing the plants. For the fall crop, the seed may be sown directly in the row and thinned; there is no gain in transplanting.

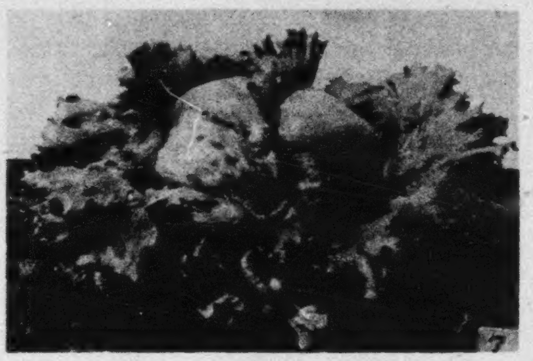


Figure G-18

Head lettuce as an early-spring crop can be grown throughout Mississippi. The Great Lakes strains (crisphead shown above) are generally more successful. Photo courtesy Burpee Seeds.

Endive

Endive closely resembles lettuce in its requirements, except that it is less sensitive to heat. It may be substituted for lettuce when the culture of lettuce is impracticable.

Parsley

Parsley is hardy to cold but sensitive to heat. It thrives under much the same temperature conditions as kale, lettuce, and spinach.

Parsley thrives on any good soil. As the plant is delicate during its early stages of growth, however, the land should be mellow.

Parsley seeds are small and germinate slowly. Soaking in water overnight hastens the germination. After seeding, it is well to lay a board over the row for a few days until the first seedlings appear. After its removal, day-to-day watering will insure germination of as many seeds as possible. Parsley rows should be 14 to 16 inches apart, with the plants 4 to 6 inches apart in the rows. A few feet will supply the family.

Kale

Kale, or borecole, is hardy and lives over winter in latitudes as far north as northern Maryland and southern Pennsylvania. It is also resistant to heat and may be grown in summer. Its real merit, however, is as cool weather greens.

Kale is a member of the cabbage family. The best garden varieties are low-growing, spreading plants, with thick, more or less crinkled and curled leaves.

In the autumn, the seed may be broadcast very thinly and then lightly raked into the soil. Except for spring sowings, made when weeds are troublesome, sow kale in rows 18 to 24 inches apart and later thin the plants to about a foot apart.

Kale may be harvested either by cutting the entire plant or by taking the larger leaves while young. Old kale is tough and stringy.

Mustard (See Figure G-19)

Mustard grows well on almost any good soil. As the plants require but a short time to reach the proper stage for use, frequent sowings are recommended. Sow the seeds thickly in drills as early as possible in the spring or, for late use, in September or October. The forms of Indian mustard, the leaves of which are often curled and frilled, are generally used. Southern Curled and Green Wave are common sorts.

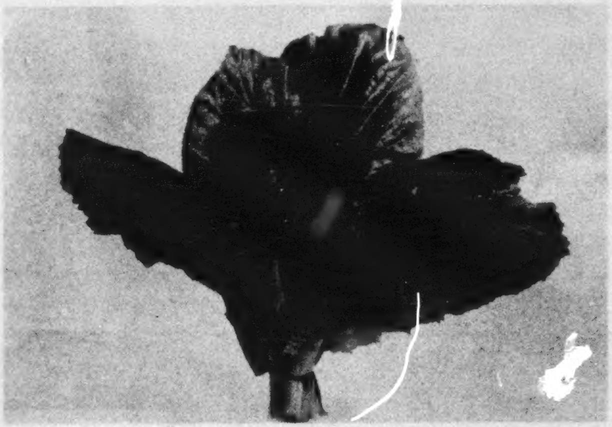


Figure G-19

Mustard is a popular southern leafy vegetable. Florida Broadleaf, one of the popular varieties is shown above. Photo courtesy Burpee Seeds.

Spinach

Spinach is a hardy cool-weather plant that withstands winter conditions in the South.

Spinach will grow on almost any well-drained, fertile soil where sufficient moisture is available. It is very sensitive to acid soil. If a soil test shows the need, apply lime to the part of the garden used for spinach, regardless of the treatment given the rest of the area.

The application of 100 pounds of rotted manure and 3 to 4 pounds of commercial fertilizer to each 100 square feet of land is suitable for spinach in the home garden.

For tractor cultivation, the rows of the garden should be not less than 24 inches apart; when land is plentiful they may be 30 inches apart. For wheel-hoe or hand work, the rows should be 14 to 16 inches apart. Spinach may be drilled by hand in furrows about 1-inch deep and covered with fine earth not more than 1/2-inch deep, or it may be drilled with a seed drill, which distributes the seed more evenly than is ordinarily possible by hand. Thin the plants to 3 or 4 inches apart before they crowd in the row.

Turnip Greens

Varieties of turnips usually grown for the roots are also planted for the greens. Shogoin is a favorable variety for greens. It is resistant to aphid damage and produces fine-quality white roots if allowed to grow. Seven Top is a leafy sort that produces no edible root. As a rule, sow turnips to be used for greens thickly and then thin them, leaving all but the greens to develop as a root crop. Turnip greens are especially adapted to winter and early-spring culture in the South. The cultural methods employed are the same as those for turnip and rutabaga.

Turnip and Rutabaga (See Figure G-20)

Turnips and rutabagas, similar cool-season vegetables, are among the most commonly grown and widely adapted root crops in the United States. They are grown in the South chiefly in the fall, winter, and spring.

Turnips reach a good size in 60 to 80 days, but rutabagas need about a month longer. Being susceptible to heat and hardy to cold, these crops should be planted as late as possible for fall use, allowing time for maturity before hard frost.

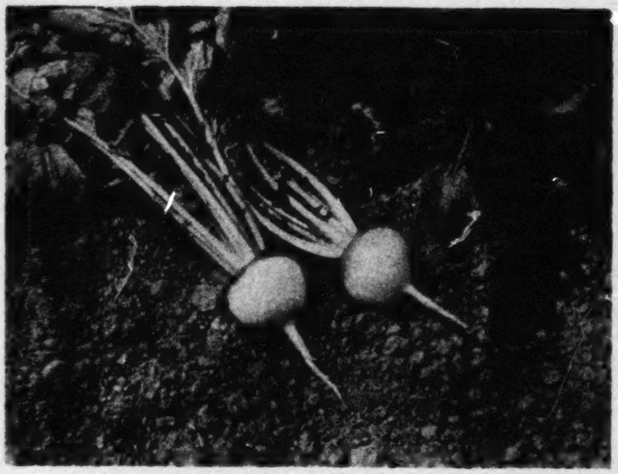


Figure G-20

Turnips are grown for both the foliage and root. An older common variety --Purple top—Whiteglobe is shown above. Photo courtesy Burpee Seeds.

Radish

Radishes are hardy to cold, but they cannot withstand heat. In the South, they do well in autumn, winter, and spring.

Radishes are not sensitive to the type of soil so long as it is rich, moist, and friable. Apply commercial fertilizer when the seeds are sown; conditions must be favorable for quick growth. Radishes that grow slowly have a pungent flavor and are undesirable.

Radishes mature the quickest of our garden crops. They remain in prime condition only a few days, which makes small plantings at 1-week or 10-day intervals advisable. A few yards of row will supply all the radishes a family will consume during the time the radishes are at their best.

Kohlrabi (See Figure G-21)

Kohlrabi is grown for its swollen stem. Kohlrabi may be grown almost any time except midsummer. The seeds may be started indoors and the plants transplanted in the garden; or the seeds may be drilled in the garden rows and the plants thinned to the desired stand. Kohlrabi has about the same soil and cultural requirements as cabbage, principally a fertile soil and enough moisture. It should be harvested while young and tender.

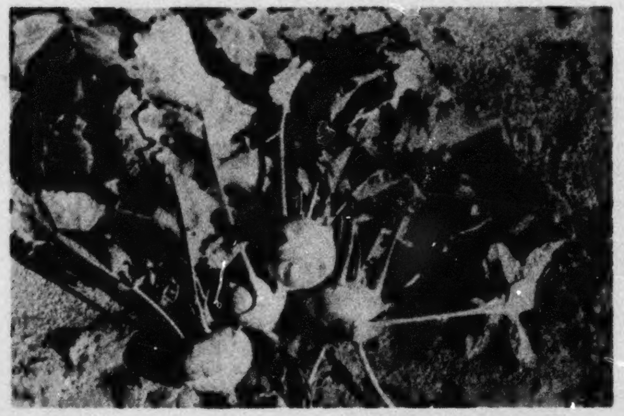


Figure G-21

An unusual vegetable in the south is the turnip-like kohlrabi. The edible stem or "turnip" is produced above ground.

Potato

Potatoes, when grown under favorable conditions, are one of the most productive of all vegetables in terms of food per unit area of land.

Potatoes are a cool-season crop; they do not thrive in midsummer. Any mellow, fertile, well-drained soil is suitable for potato production. Stiff, heavy clay soils often produce misshapen tubers. Potatoes respond to a generous use of commercial fertilizer, but if the soil is too heavily limed, the tubers may be scabby.

Commercial fertilizer can be applied at the time of planting, but it should be mixed with the soil in such a way that the seed pieces will not come in direct contact with it.

In preparing seed potatoes for planting, cut them into blocky rather than wedge-shaped pieces. Each piece should be about 1-1/2 ounces in weight and have at least one eye. Medium-sized tubers weighing 5 to 7 ounces are cut to best advantage.

Plant early potatoes as soon as weather and soil conditions permit. Fall preparation of the soil often makes it possible to plant the early crop without delay in late winter or early spring. Potatoes require 2 to 3 weeks to come up, depending on depth of planting and the temperature of the soil. In some sections the ground may freeze slightly, but this is seldom harmful unless the sprouts have emerged. Prolonged cold and wet weather after planting is likely to cause the seed pieces to rot. Hence, avoid too early planting. Young potato plants are often damaged by frost, but they usually renew their growth quickly from uninjured portions of the stems.

Do not dig potatoes intended for storage until the tops are mature. Careful handling to avoid skinning is desirable, and protection from long exposure to light is necessary to prevent their becoming green and unfit for table use. Store in a well-ventilated place where the temperature is low, 45° to 50° if possible, but where there is no danger of freezing.

Sweet Potatoes

A well-drained, moderately deep sandy-loam soil of medium fertility is best for sweet potatoes. Heavy clays and very deep loose-textured soils encourage the formation of long stringy roots. For best results, the soil should be moderately fertilized throughout. If applied under the rows, the fertilizer should be well mixed with the soil.

The plants are usually set on top of ridges, 3-1/2 feet to 4 feet apart, with the plants about 12 inches apart in the row. When the vines have covered the ground, no further cultivation is necessary, but some additional hand weeding may be required.

Dig sweet potatoes a short time before frost, on a bright drying day when the soil is not too wet to work easily. On a small scale they may be dug with a spading fork, great care being taken not to bruise or injure the roots. Let the roots lie exposed for 1 to 2 hours to dry thoroughly; then put them in containers and place them in a warm room to cure. The proper curing temperature is 85° F. Curing for about 10 days is followed by storage at 50° F—55° F.

Onion (See Figure G-22)

Onions thrive under a wide variety of climatic and soil conditions, but do best with an abundance of moisture and a temperate climate, without extremes of heat or cold through the growing season. In the South, the onion thrives in the fall, winter, and spring.

Any type of soil will grow onions, but it must be fertile, moist, and in the highest state of tilth.

Onions may be started in the home garden by the use of sets, seedlings, or seeds. Sets, or small dry onions grown the previous year—preferably not more than 3/4 of an inch in diameter—are usually employed by home gardeners. Small green plants grown in an outdoor seedbed in the South or in a hotbed or a greenhouse are also in general use.

Sets and seedlings cost about the same; seeds cost much less. In certainty of results the seedlings are best; practically none form seedstalks. Seed-sown onions are uncertain unless conditions are extremely favorable.

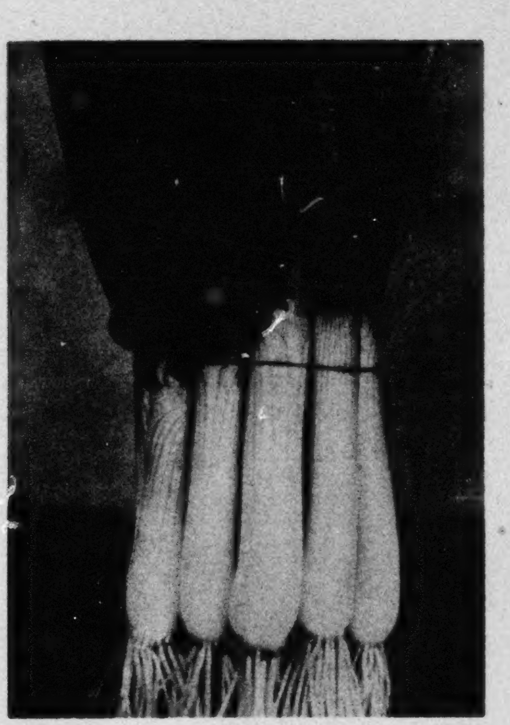


Figure G-22

Onions are popular throughout the state. The ever-popular bunching type shown above is one of the major types. Photo courtesy Burpee Seeds.

Shallot

The shallot is a small onion of the Multiplier type. Its bulbs have a more delicate flavor than most onions. Its growth requirements are about the same as those of most other onions. Shallots seldom form seed and are propagated by means of the small cloves or divisions, into which the plant splits during growth. The plant is hardy and may be left in the ground from year to year, but best results are had by lifting the clusters of blubs at the end of the growing season and replanting the smaller ones at the desired time.

Okra (See Figure G-23)

Okra, or gumbo, has about the same degree of hardiness as cucumbers and tomatoes and may be grown under the same conditions. It thrives on any fertilie, well-drained soil. An abundance of quickly available plant food will stimulate growth and insure a good yield of tender, high-quality pods.

As okra is a warm-weather vegetable, the seeds should not be sown until the soil is warm. The rows should be from 3 to 3-1/2 feet apart, depending on whether the variety is dwarf or large growing. Sow the seeds every few inches and thin the plants to stand 18 inches to 2 feet apart in the row. Clemson Spinless, Emerald, and Dwarf Green are good varieties. The pods should be picked young and tender, and none allowed to ripen. Old pods are unfit for use and soon exhaust the plant.

Figure G-23

Okra, or gumbo, is a popular southern vegetable. It is grown for the edible pods which are fried, boiled and used in soups, etc.

Tomato (See Figure G-24)

Tomatoes grow under a wide variety of conditions and require only a relatively small space for a large production. Of tropical American origin, the tomato does not thrive in very cool weather. It is suited to spring, summer, and autumn culture. By adopting a few precautions, the home gardener can grow tomatoes practically everywhere, given fertile soil with sufficient moisture.

Start early tomato plants from 5 to 7 weeks before they are to be transplanted to the garden. Enough plants for the home garden may be started in a window box and transplanted to small pots, paper drinking cups with the bottom removed, plant bands (round or square), or other soil containers. In boxes, the seedlings are spaced 2 to 3 inches apart. Tomato seeds germinate best at about 70° F, or ordinary house temperature. Growing tomato seedlings, after the first transplanting, at moderate temperatures, with plenty of ventilation, as in a coldframe, gives stocky, hardy growth. If desired, the plants may be transplanted again to a larger container, such as 4-inch clay pots or quart cans with holes in the bottom.

Tomato plants for all but the early spring crop are usually grown in outdoor seedbeds. Thin seeding and careful weed control will give strong, stocky plants for transplanting.

Tomatoes are sensitive to cold. Never plant them until danger of frost is past. By using plant protectors during cool periods, the home gardener can set tomato plants somewhat earlier than would otherwise be possible. Hot, dry weather, like midsummer weather in the South is also unfavorable for planting tomatoes. Planting distances depend on the variety and on whether the plants are to be pruned and staked or not. If pruned to one stem, trained, and tied to stakes or a trellis, they may be set 18 inches apart in 3-foot rows; if not, they may be planted 3 feet apart in rows 4 to 5 feet apart. Pruning and staking have many advantages for the home gardener. Cultivation is easier, and the fruits are always clean and easy to find.

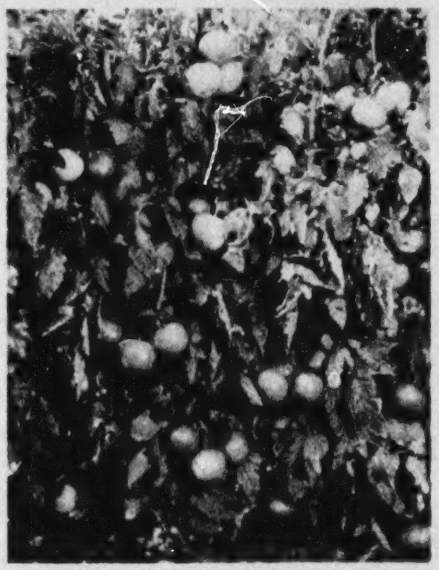


Figure G-24

A favorite garden vegetable is the tomato. Above photo shows fruit in varying stages of development. Photo courtesy Burpee Seed.

Pepper (See Figure G-25)

Peppers are more exacting than tomatoes in their requirements, but may be grown over a wide range in the United States. Being hot-weather plants, peppers cannot be planted until the soil has warmed up and all danger of frost is over. Planting dates vary with the location, fall planting being practiced in some locations. Start pepper plants 6 to 8 weeks before needed. The seeds and plants require a somewhat higher temperature than those of the tomato. Otherwise, they are handled in exactly the same way.

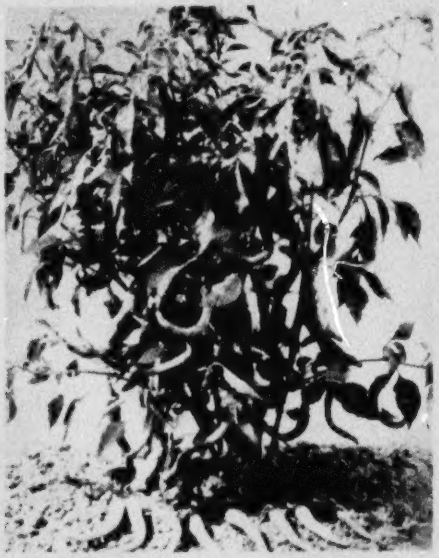


Figure G-25

A plant of hot pepper—cayenne variety. Photo courtesy Burpee Seed.

Sweet Corn (See Figure G-26)

Sweet corn requires plenty of space and is adapted only to the larger gardens. It needs a fertile, well-drained, moist soil. With these requirements met, the type of the soil does not seem to be especially important, but a clay loam is almost ideal for sweet corn. There must be at least 3 rows side by side in order to assure adequate pollination.

Sweet corn may be planted from early spring until autumn, but the corn earworm, drought, and heat make it difficult to obtain worthwhile results in midsummer. The ears pass the edible stage very quickly, and succession planting is necessary to insure a constant supply.

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Hybrid sweet corn varieties, both white and yellow, are usually more productive than the open-pollinated sorts. As a rule, they need a more fertile soil and heavier feeding. Many are resistant to disease, particularly bacterial wilt. Never save seed from a hybrid crop for planting. Such seed does not come true to the form of the plants from which it was harvested.

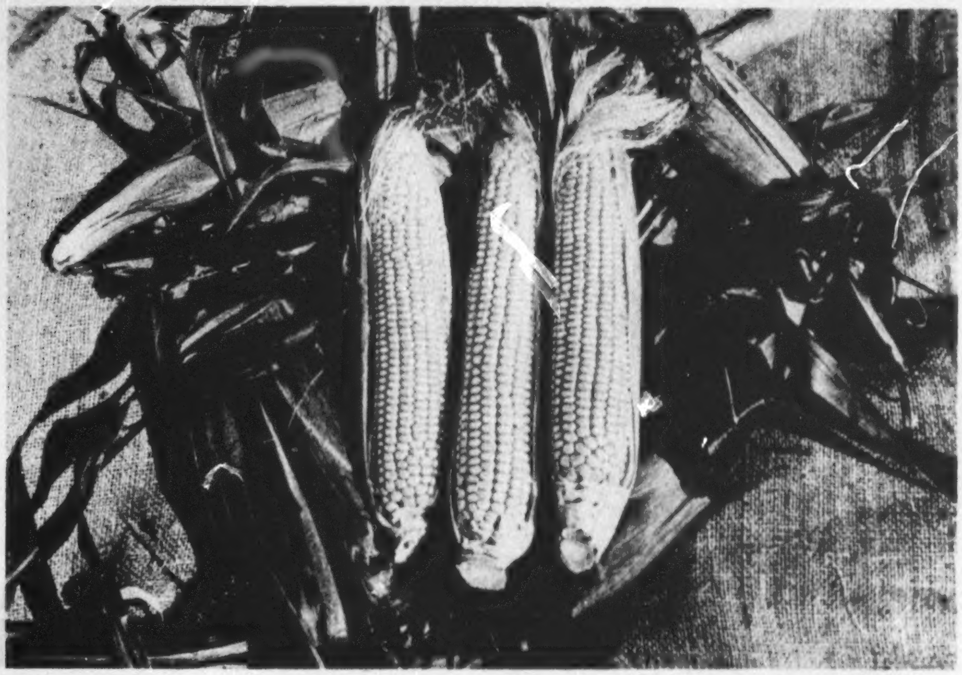

Figure G-26

Sweet corn is an ever-popular vegetable prized for flavor. The hybrids are much more productive than the open pollinated types. Photo courtesy Burpee Seeds.